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ORIGINAL ARTICLES.

OLEOMARGARIN.[1]

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NEARLY all of the ordinary natural fats and fatty oils consist essentially of three glycerides—palmitin, stearin, and olein. The difference in odor and taste whereby they are distinguishable from one another is due to *very small* quantities of other substances that they contain, and that are always associated with them in their natural or in their prepared condition. Castor oil, olive oil, tallow, and lard oil are unmistakably different to our senses of taste and smell; but all of them alike consist essentially of palmitin, stearin, and olein, this mixture being scented and flavored by small quantities of the foreign substances mentioned.

There is an important difference between the fat in milk and some other fats, on the one hand, and the fat of tallow, lard, palm-nut oil, etc., on the other hand—a distinction all the more interesting because it exists between the fat that is deposited on the carcass and that which is secreted in the milk of the same animal. Butter and tallow are mostly but mixtures of olein, palmitin, and stearin, the same three glycerides that are so widely distributed in the fats everywhere; but butter-fat contains, besides the four other glycerides, butyrin, caproin, caprylin, and caprin; but as even these glycerides are as tasteless and odorless as any of the others when purified, nothing of the odor or flavor of butter can be credited to them. This being the case, then, it is only natural that the attempt should be made to give a butter flavor and aroma to the more abundant and much cheaper fats of the animal carcass. It is only a question of transforming the carcass-fat into a fat of the same consistency as that of butter at ordinary temperature, removing its characteristic flavor, and substituting therefor the butter flavor. The first change is easy enough, consisting as it does simply in taking out a certain proportion of the less fusible stearin and palmitin, so as to leave a residue with a larger proportion of olein, and therefore softer at common temperatures, as butter is softer than tallow; since odor and flavor are largely due to volatile and soluble substances, steaming and washing the fat will leave a sufficiently odorless and tasteless product as a basis for receiving the desired butter flavor. It is plain that the available quantity of this product from the carcass-fat is much larger than the available quantity of the material like which it is to be flavored—the butter-fat of milk. How, then, shall this flavor be imparted?

We know quite well that when it comes to communicating the flavor of lemon, strawberry, or raspberry to ice-cream or cake, not even the shadow of the fruit need be cast over the material to be thus flavored; much less need any of its substance be incorporated with the cream or dough. The chemist in his laboratory can manufacture at least many of these flavoring essences more cheaply than they can be made from the fruits. But I am not aware that any essence of cow's butter has ever yet been prepared. A clean mixture of olein, stearin, and palmitin, no matter how carefully the proportions of these three ingredients might be adjusted to secure the right consistency, and no matter how deftly colored, would never pass for butter even with the least fastidious. Therefore the amount of artificial salable butter that can be made from this oleomargarin is limited by the degree of thinness with which real butter-fat, with its butter flavor, can be distributed through it and produce a resemblance to butter.

Although margarin does not occur in animal fats, its name still remains associated with the less fusible part of animal and vegetable fats, although this mixture is one of palmitin and stearin only; and since olein from the other series of glycerides is always associated with palmitin and stearin in these fats, we have the familiar name oleomargarin for this manufactured product; the same name could just as appropriately be given to any fat, and just as incorrectly also, but it has come to be a trade name the meaning of which is understood by everybody. Only when this oleomargarin, or oleo oil, as it is sometimes also called, is churned with milk and water, do we have the real artificial butter or butterine.

The fat, said to be only the caul fat, and possibly so in all the large manufactories, is washed in cold water, surrounded with ice until the animal heat is removed, cut up fine, heated to from 120° to 150° F., allowed to stand until the fat is separated clear from the tissue, then kept in wooden tanks for from twenty-four to thirty-six hours, in a warm room at

[1] Abstract of a lecture delivered before the Franklin Institute, Philadelphia, January 18,.1892.

such a temperature as will favor the crystallizing out of the largest part of the stearin with a little of the palmitin; then, in hydraulic presses in the same room, the solid fat is separated from the liquid, or the oleo oil, as it is called. Another product is prepared from lard in a similar manner, except that no stearin is removed from it, and this goes by the technical name of "neutral." From this "oleo oil" and "neutral," the oleomargarin and butterine are made, more "oleo" being put in if the product is to go to a cold climate, more "neutral" if to a warm one, the proper mixture of the two being churned in a steam-jacketed vessel, with about 48 gallons of milk to 2000 pounds of the fat, or 80 pounds to 500; it is stated that cream is sometimes used in the place of milk; butter-color, or annatto, is used unless forbidden. The churned product is suddenly cooled by allowing it to run out on to ice or cold water, then washed, salted, and worked as butter usually is. The use of lard is comparatively recent, and it is interesting to notice that the first manufacturers were very indignant when it was attempted in the West to palm off a product from lard as oleomargarin; they used about the same contemptuous expressions as the dairymen used so freely when speaking about the oleomargarin.

Such is the substance of the process for the manufacture of artificial butter in its various forms. As to the quality of the product, in the first place it keeps well, if made from clean materials. A second important quality is such close resemblance to genuine butter of a fair quality, that often only experts can distinguish the one from the other. But by far the most important question concerning oleomargarin as food is that of its wholesomeness, as compared with butter. The answer to this question turns on two points: first, the quality of the materials used in its manufacture, and second, its digestibility when properly made. It may be safely said that no other food-product has been so much discussed in respect to its healthfulness, large pecuniary interests being involved.

In the first place, what bearing has the quality of the materials used in the manufacture of oleomargarin on its wholesomeness? Concerning this, most damaging statements have been made, especially at the very beginning of the oleomargarin war. If even the half of these statements were true, then certainly a committee of the New York Legislature, intent on making in its report the very worst showing possible against oleomargarin, in support of a very stringent prohibitory law, would have obtained similar ones from some of the numerous witnesses cited before it; but a careful examination of the whole printed report of 275 pages reveals no worse statement than this: that not merely the caul fat, or that on the membrane investing the viscera is used, but also that on the intestines themselves; and this witness affirms that this fat was in the vats mixed up with some of the excrementitious matters naturally associated with fat in that state. But in another place in the same report the manager of the same factory testifies that not all of the fat received at the establishment is used for oleo, since they manufacture tallow also, and that but a very little of the intestines remains attached to that part of the fat used for oleo. The first witness did not testify that he actually saw the foul fat that he described worked into the oleo oil. No sound proof is anywhere given that such extravagant statements as those that I have quoted are founded on fact, or were anything more than conjectures and guesses.

But oleomargarin has been no less bitterly and extravagantly attacked on another line, namely, with reference to what has been found in it, especially on microscopic examination. Prof. Michels, of New York, in 1878, stated that he had found cells of a suspicious character and fragments of muscle and tissue in some of the samples that he examined; these, however, he acknowledged came from the chopped stomach then used according to the original Megé patent; but he affirmed that trichinæ might get into the butter in this way, and that the heat to which the fat was subjected in the course of the rendering and the crystallizing would not be high enough to kill them. In 1880 a Prof. Piper gave in a Chicago newspaper some startling drawings of what he had seen in samples of oleomargarin butter under the microscope—shreds of animal tissue, spores, and a form often found by him in foul water; and in another paper he gave, side by side, figures of actual tapeworm eggs, and of forms very much like them in appearance, from oleomargarin. Passing on to a later date, when the addition of chopped stomachs and mammary glands had been entirely given up, very little is reported of observations of this kind. A Prof. Nachtrieb is quoted as finding in a sample of butterine parasites that are present in the rectum of swine and in the evacuations of patients suffering from diarrhea; but without further knowledge as to the reliability as a microscopist of this professor, one should give little weight to such a startling statement.

Two samples of artificial butter were reported by an official of the Department of Agriculture, out of ten, as being full of fungi and their spores; but as all of them were reported as being in a bad condition even for samples of butterine, such an observation furnishes no reliable evidence as to the usual quality of the substance; further, the reputation of this observer was not of the best.

The answer to the question of the wholesomeness

of the oleomargarin must then be sought on other lines of inquiry. Fats, as such, are not unwholesome, when not eaten in excess; we need then only to consider whether oleomargarin is as digestible as butter.

By far the best statement of the case, it may be said, against oleomargarin in this respect, is to be found in the second annual report of the New York State Dairy Commissioner for the year 1885, by Dr. R. D. Clark, chemist for the Commissioner. Many authorities are there quoted to the effect that butter is more digestible and wholesome than lard or other natural fats; and this difference is attributed to the more complex composition of the former, and especially to its butyrin; and the effect of this is supposed to be due to the ease with which it breaks up into fatty acid and glycerin; saponification is thus facilitated, and this soap in its turn favors the digestion of the other fats of the butter. The digestion of the fats consists partly in this saponification, and partly in their conversion into an emulsion; Dr. Clark performed some emulsionizing experiments with different fats and the pancreatic juice, which is the chief emulsionizing agent of the digestive liquids. Next to cod-liver oil, butter gave the finest emulsion in twelve hours, while oleomargarin still had many large globules, unchanged, left. It is fair to suppose that the finer the emulsion, and the more quickly it is made, the more readily the fat will be absorbed and assimilated and taken into circulation, and that easy saponification will also favor digestion. Dr. Clark also proved that while butter melts to a clear limpid liquid in thirty-five minutes at 100° F., the oleomargarin was but slightly changed; even after five hours, the latter was still in a semi-solid condition; this property of oleomargarin is certainly not favorable to its digestion. Thus a very good case is made out by Dr. Clark, to the effect that oleomargarin is in all probability less digestible than butter. This view is supported by the results of a comparative test of the proportion of fat absorbed by a man and a boy using butter of the ordinary kind for three days, and then oleomargarin for the same period. The difference was slightly in favor of the butter, but so slight that the writer considered that it might be neglected, except in the case of invalids or very young children. In France the first opinion of medical men, in 1872, as to the digestibility of oleomargarin was not unfavorable; but eight years later it was pronounced against in the Paris Academy of Medicine, the statement being that it could not replace good butter because, on account of the higher percentage of fatty acids, it emulsionized less easily, and was therefore less easily absorbed; but I can find no account of any actual digestion experiments in support of this conclusion, like those of Clark's just quoted, and which are of more account than any theorizing.

The question of the occurrence of germs of disease in oleomargarin is of such great importance, that it needs some little further consideration. The possibility of their occurrence there cannot be denied; and it must be allowed that the heat used in any stage of the manufacture of the oleomargarin is not sufficient to kill these germs. Dr. Clark gives as diseases that may be communicated from animals to man: consumption, anthrax, tapeworm, glanders, foot-and-mouth disease, cow-pox, hydrophobia, etc.; the etc. implies that there are still others, but the list is fearful enough as it is. Now, what evidence is there that there are any of these disease-germs in oleomargarin? Granted that they may be there; but have they ever been found there by reliable observers? Any such evidence, sound and satisfactory, would be the most damaging that could possibly be made against this food-product. The observations made by Piper and Nachtrieb lack utterly the confirmation of repetition by others; no similar observations have ever been reported since. Dr. Clark does not even refer to them. It may, therefore, be safely affirmed that there is no evidence whatever that in the oleomargarin of later years—from 1885 up to the present time—any germs of disease exist.

But good evidence of the communication of any of these diseases to man by the use of oleomargarin would be no less fatal to this food-product. Members of Congress assert that its consumption leads to insanity, Bright's disease, and ailments that undermine the strongest constitution; that it is "freighted with disease, freighted with death;" "that it spreads death throughout the country." Dr. Clark, in response to the call for cases of illness caused by oleomargarin, can only say that "We have seen many cases of sickness, much of it dyspepsia, during the period in which bogus butter was so freely sold without restriction, for which we have been unable to assign any cause; this cause may have been the use of artificial butter, but the deceptive manner in which it has been handled prevented physicians from ascertaining its effects; consequently we must judge by its qualities." This is a confession that up to that time—1886—and only shortly after a time when it was claimed that twenty million pounds per annum were made and mostly used in New York and New England, no case of disease nor any general specific form of disease could be pointed out as due even in the most indirect manner to the use of this food-product. A widely quoted statement to the effect that the physicians of Chicago attributed an epidemic of winter cholera to the extended use of butterine in that city, into the composition of which lard entered largely, may be taken for what it is

worth, as an exception to this statement of mine. I cannot verify or dispute it.

The Chairman of the New York Legislative Committee, from which emanated the present stringent prohibitory laws of that State, in his report on the committee's investigations, could only say in reference to the wholesomeness of oleomargarin, that sickness of various kinds may result from its use, communicated by the germs of disease that have been found in samples of it, but nowhere in the report of the committee is any evidence adduced of the occurrence of these germs. Even a single case of disease, unmistakably attributable to oleomargarin, would have been invaluable in promoting the passage of the desired law, but he could not produce it. And in another place in the report he frankly admits that "There is evidence on both sides as to its wholesomeness. Time and further investigation may be needed in order to establish a satisfactory solution of the question of trichinæ, animalcules, or germs of disease in raw animal fats and their tissues. Meanwhile, however, there is well-grounded suspicion of them." Time there has been—years of it—since that report was made public. The prohibitory law was passed, but no further investigation has been reported on the trichinæ and germ question, and the danger of disease from this cause must be regarded as unproved.

Beyond what I have given you in what has gone before, I find nothing more in the literature of the subject for the past twenty years that relates to the question of the danger to health in the use of oleomargarin, except numerous statements by scientific men of eminence in this and other countries. Morton, President of Stevens Institute; Chandler, of Columbia College, for so many years President of the New York City Board of Health; Johnson and Brewer, of Yale, both well known by the farmers throughout the country for the good work they have done in behalf of agriculture; Goessman, now and for many years past Director of the Massachusetts Agricultural Experiment Station; Atwater, of Connecticut, so well known for his writings on food products; Armsby, Director of the Pennsylvania Experiment Station; Alvord, most prominently identified with the interests of farmers for many years, and now Director of the Maryland Experiment Station—all have spoken or written in favor of oleomargarin as a food-product. It has required the courage of their convictions for many of these men to utter their opinions, and they have in many cases had only the comfort of a clear conscience to offset the abuse of the agricultural press that has been heaped upon them. Abroad I would mention particularly Lyon Playfair, "one of the most distinguished chemists and sanitary authorities of England." In his place as member of Parliament, he spoke in a very different strain from that indulged in by some of our Congressmen, when he said: "As to the relative wholesomeness of oleomargarin and butter, I do not think there is anything to choose between them. Certainly rancid oleomargarin is a nasty and unwholesome compound, but not any more so than nasty and rancid butter, which abounds in so many markets. Both are unfit for human food, although both may be well purified by well-known processes." I would like to quote more freely from his admirable speech, but lack of time forbids.

Finally, allow me to call your attention to the most remarkable absence of any reference to this food-product by the most active and efficient State boards of health in this country. If there were such dangers lurking in oleomargarin as has so many times been asserted, surely these boards of health have seriously failed in the discharge of their duty in giving so little attention as they have to the matter. A careful examination of the file of such State board of health reports as are in our library discovers almost no reference to oleomargarin.

The whole question of the wholesomeness of oleomargarin as food is summed up in my own mind about in this wise: When properly made from fresh and clean material, it differs but slightly from butter in healthfulness, and only because of its somewhat less easy digestibility, and that dyspepsia is likely to be due to a far greater extent to other causes than to this, even among those who, because of its cheapness as compared with butter, would be likely to use it largely. It is possible that it may be made from such unsuitable materials as to contain germs of disease, and that it might thus communicate disease to man, but there is no positive proof that it is now made of such materials, or ever has been, or that any disease has ever been communicated to man by its use. But the possibility exists all the same, and the only way to make it of no effect is by careful inspection of the process of manufacture by proper officials, and such inspection would be necessary in order to put the wholesomeness of the substance beyond all question.

New York being a great dairy State, and also, in the beginning, the great center of the manufacture of oleomargarin, was naturally one of the States in which special legislation began earliest. Two enactments in 1882 prohibited, first, the coloring of the product to make it resemble butter, or the sale of any such colored product; and, second, required that all packages containing any such imitation of butter or cheese should be plainly labelled. In 1884 the manufacture and sale of such imitation were forbidden in a special section of a general dairy law. This was pronounced unconstitutional by the Court of Appeals, but another slightly dif-

ferent enactment in the following year was allowed to stand. At the close of 1885, Maine, Michigan, Minnesota, Missouri, New Jersey, Pennsylvania, and Wisconsin, beside New York, had laws prohibiting the sale of oleomargarin or any kind of artificial butter made from other fats, and New Hampshire had a law that was practically prohibitory, requiring that all imitations of butter should be colored pink. California, Connecticut, Delaware, Ohio, Oregon, Rhode Island, Tennessee, Vermont, West Virginia had simply regulative laws, providing that the substance shall be sold under its own name. At the close of the year ending June 30, 1891, Maryland had been added to the list of prohibitory States, and Minnesota, Vermont, and West Virginia had joined company with New Hampshire in requiring the pink coloration of the artificial butter, while New Jersey, Massachusetts, and Ohio prohibited the sale of it only if colored in imitation of butter. Of the other States, Arkansas, Kentucky, North Carolina, Tennessee, Utah, and Washington had no enactments in regard to the matter. The remainder of the States, twenty-five in number, only required that it should be sold under its own name, and not as genuine butter. Abroad the laws are all regulative and not prohibitory.

In 1886 a national law was passed under the title of "An Act defining butter, also imposing a tax upon and regulating the manufacture and sale and importation of oleomargarin." This Act required every manufacturer to pay a license fee of four hundred and eighty dollars, and every retail dealer selling in quantities less than ten pounds to pay a fee of forty-eight dollars, and that every pound sold shall pay a tax of five cents. It was first attempted to make this ten cents, but by reduction to the lower figure the enactment was saved from being practically prohibitory. President Cleveland approved the measure on the ground that Congress is justified in making oleomargarin a subject of internal taxation; that Congress may clearly levy such taxes as will confer incidental advantages on the people, and that no industry is better entitled to such incidental advantages as may follow this legislation than our farming interests, and that the quality of the article will come under more strict scrutiny, so that only a good and clean product will be sold, and, finally, the product will be sold under its own name, and fraud and imposition will thereby be suppressed.

The constitutionality of this final enactment was decided on this ground: that when a product of manufacture is turned out so closely resembling some other product of which the manufacture is already established as not to be distinguishable from it by the senses, and is made for sale in the place of that substance, it is constitutional to prohibit the manufacture and sale of it. But if it is turned out, say uncolored, then its manufacture and sale cannot be prohibited, except on plain grounds of injury to the health of the community.

Recalling to mind some of the extravagant statements in Congress in support of this measure, and especially of the ten-cent clause of it, the comment on it by a prominent agricultural paper is appropriate, that "If oleo is as bad as it has been painted, the new law will make the Government party to the crime of permitting an unwholesome article, and is, therefore, simply and purely a compromise with the devil." I wonder how many actually believed that it was so bad?

In the case of the prohibitory law of this State, the Supreme Court affirmed its constitutionality, saying that "the manufacture of an article may alike be prohibited by the legislature, if in their judgment the protection of the public from injury and fraud requires it. The fact that the prohibited article may be innocuous is irrelevant—the sale of a mixture of pure water and milk has been prohibited." Here, again, the question of the public health is not taken into account. Of the same character was the decision of the Missouri Court of Appeals on the constitutionality of the prohibitory law there; nothing was said about the public health.

In the case of the almost frantic appeals sent out from Washington at the time that the practically prohibitory bill with the ten-cent clause was pending, it was the farmers of the country who were called upon to work upon their representatives directly, and upon the Senate through their respective legislatures, to secure the sufficient support of the bill in Congress.

Not a few protests have appeared from time to time against such legislation, even in the agricultural press. One of the most prominent dairy writers of the country, writing before the passage of these laws said: "There is no law, and there can be no law, to prevent its sale for what it is." Another, who, while he lived, was looked up to as among the highest authorities in the country on dairying, when asked if the manufacture of oleomargarin should be prohibited by law, answered: "By no means; its manufacture is as legitimate as that of butter. Its manufacture is actually a blessing. On the one hand it is suppressing the lower grades of butter, and on the other hand it makes the finer brands of creamery butter more sought after. There is nothing for the dairymen to fear in it; their safety can be insured by improving their butter product."

As to the total production in the country at any time previously to the passage of the national law, there appear to be no reliable data. It was wildly stated to be 200,000,000 pounds; it was allowed by those not interested in making the estimate too

high, that the amount may have been half as great. For the fiscal year ending June 30, 1886, it was estimated on the basis of data claimed to be reasonably sound, to be about 33,000,000 pounds. In the following year it was nearly 34,350,000 pounds, in the next year 35,664,000. During the year ending June 30, 1891, 44,000,000 pounds were produced, and a still larger output is predicted for the year ending June 30, 1892.

As to the quality of the product now, as compared with what it was in the first years, such a comparison cannot be made with any degree of satisfaction, since we have so few reliable data based on official inspection of the products. President Cleveland gave this as one reason for his approval of the national law, that the quality of the article would come under more strict scrutiny, so that only a good and clean product would be sold. But it cannot be said that this hope is justified. In the first report of the commissioner under the new law, the inspectors in some cases stated that they had examined into the character of the materials used at the factories, and found everything as it should be. But since that time I find no evidence in any of the reports that any attention is given to this matter by the inspectors.

To sum up what appears to me the fair position in regard to oleomargarin: It is a food product, unquestionably; no legislation can rule it out of the list of food products. Taken into the system it follows the same course as butter does, is changed in the same way, if not perhaps so completely; is taken into the circulation and then serves precisely the same purpose that butter does. When properly made from proper materials it is entirely harmless, except possibly when consumed as freely as butter by persons with weak digestive power.

While it is claimed by manufacturers that a good artificial butter cannot be made if fats are used that are not clean and wholesome at the start, it may not be that this is fully established. But on the other hand, it must be granted that there is no evidence that any community in which artificial butter has been used, even freely and without any official inspection or restriction, has been any the worse for its use in respect to health, either individually or collectively. These being the facts in the case, it is not surprising that many regard as unjust any legislation that prohibits the manufacture or sale of this substance, whether directly or by such ridiculous subterfuges as requiring it to be colored pink or any other abnormal color. The chief motive, nay, almost the only real, hearty motive for this legislation was that of attempting to save from pecuniary damage another industry working along in the same line.

On the other hand, oleomargarin is not butter, and it is wrong to sell it as butter, no matter how good the imitation may be; probably its manufacturers and dealers have brought all this trouble in the way of prohibitive legislation on themselves, by their attempts to sell it as butter. All over the civilized world, general or special laws exist prohibiting the selling of anything for what it is not; no one denies the equity of these laws. When a man sells oleomargarin as butter, he is violating these laws, and just in proportion to the ease with which the imitation can be palmed off for what it is not, and just in proportion to the value of other useful industries that are injured by such deceit, should be the penalties imposed on the fraud, and the efficiency of the means for its detection, so that the producer of the genuine article shall not need to go far out of his way for the means of defence. Therefore laws requiring that oleomargarin shall be sold for what it is are just laws, I care not how stringent they may be.

Furthermore, there is work for boards of health in connection with the manufacture and sale of this food product in States where these are permitted; especially should its manufacture be watched. This needs to be done at least until it has been fully established that only clear fats from animals killed in health can be used. The large license fee required of manufacturers throws the manufacture into comparatively few hands, and thus inspection is rendered more easy. Under such restrictions it seems to me that the trade in this food product might be safely left to itself—and that it might be a blessing to the community as a whole in supplying, at low prices, a savory substitute for butter, which the poorer classes have to eat, far better in quality than most of that which the poorer classes have to eat if they can get only genuine butter; and for those who can afford to pay for good butter, the opportunity to get it will be better, for dairymen will be obliged to make good butter if they make it at all.

THE NERVOUS AND MENTAL PHENOMENA AND SEQUELÆ OF INFLUENZA.[1]

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THE prominence of nervous and mental phenomena has been a striking feature of the recent epidemics of influenza. Much has been written, but mainly in a desultory way, about the symptoms of the disease referable to the nervous system, and about its nervous and mental sequelæ. The part played by the nervous system in the etiology and history of the disease has been variously interpreted. One holds that it is a "nervous disease," without

[1] Abstract of a paper read before the Philadelphia County Medical Society, January 13, 1892.

explanation; another describes it as a pneumogastric neurosis; another as a neuropathy due to ptomaïne poisoning. According to Blocq, cited by Church,[1] the primary infectious action is exerted upon the nervous system during the disorder, while sequelæ are to be attributed to secondary intoxication by ptomaïnes. Cheston Morris,[2] of Philadelphia, advances the theory that the general symptoms of influenza may be traced to a derangement of function or partial paralysis of the pneumogastric nerve, and that the affection is brought about by conditions of the atmosphere that particularly tax the cardio-pulmonary apparatus, which is regulated by this nerve—a view that, after all, relegates the disease to an atmospheric or infectious cause. Graves long ago referred the bronchial and pulmonary symptoms to lesions of the nervous apparatus of the lungs, and Blakiston regarded the disease as a disorder of the nervous system, with concomitant derangement of the organs of digestion, circulation, etc. Levick,[3] who quotes the last two authorities, holds that certain symptoms are produced when the poison is expended upon the sensorium, and certain others when its influence is chiefly exerted on the respiratory centers.

The analogies or relationships between influenza and other diseases generally recognized as belonging to the nervous system, either primarily or because of the situation of their most notable lesions, have been strongly developed by able writers, as by Levick, for example, who has even suggested that epidemic cerebro-spinal fever, or cerebro-spinal meningitis, may simply be a malignant form of influenza—a view to which he was led because of the resemblance in the symptoms of the two diseases, which differ in degree rather than in nature, and also because for three centuries the two have occurred coincidently or in close sequence.

Grasset and Rauzier,[4] in a monograph on the influenza of 1889–90, lay great stress on the enormous predominance of the nervous over the catarrhal elements in the epidemic, as indicated by the high fever, the intense cephalalgia, the marked delirium, the widespread pain, and the excessive nervous irritability. They refer to cases reported by M. Coustan, in which the entire symptomatology of the disease seems to have reduced itself to a horrible migraine.

According to Schmitz,[5] influenza is a disease of the nervous system, with secondary involvement of the heart, lungs, and digestive organs. In several hundred cases that he observed the nervous symptoms were always primary, and were in every case followed by secondary manifestations in other organs.

The briefest consideration of the subject brings forcibly to mind the fact that all diseases of infectious or toxic origin—epidemic, endemic, sporadic, or accidental—may involve any or all parts of the nervous system with a result that will be proportionate—first, to the virulence of the infecting agent; and, second, to the resistance of the individual, whether or not this be affected by constitutional predisposition or by the results of previous injury or disease. The etiologic elements may differ, but a bond of union and a close resemblance can be recognized among the effects on the nervous system of all contagious and infectious diseases, such as variola, scarlatina, diphtheria, measles, whooping-cough, typhoid fever, typhus fever, leprosy, mumps, cholera, erysipelas, puerperal fever, influenza, or cerebro spinal meningitis; of all such constitutional and diathetic affections as tuberculosis, gout, rheumatism, and diabetes; and of all such toxic agents artificially introduced into the system as alcohol, mercury, lead, arsenic, copper, and poisonous gases. These diseases, these diatheses, and these poisonous liquids, metals, and gases produce or may produce nervous and mental phenomena of the same character, differing in degree in particular cases and for special reasons.

In the course of any of the affections named there may at one time or another be present such symptoms as great mental and nervous debility, irritability, restlessness, sleeplessness, or the opposite states of torpor, stupor, hebetude, or coma; delirium; vertigo or syncope; aches and pains of all degrees of severity referred to various nerve-areas; hyperesthesia of the skin, of muscle-masses, or confined to nerve-trunks or branches; spasms, local or general, and with or without loss of consciousness; sometimes mental disturbance amounting to true mania or melancholia—in brief, any infectious or toxic disease may produce the same symptom, syndrome, or train of phenomena, as a result of the introduction into the system of an agent that directly and powerfully poisons nerve-centers, and possibly also nervous conducting tissues.

Following all infectious, diathetic, or toxic diseases, moreover, or directly springing from them, common experience teaches that we may have great nervous or general weakness; forms of insanity of the depressive type; paresis and paralysis of every grade from an affection of a single muscle to that of all the extremities, and even more; localized spasm or cramp; general convulsions;

[1] Church: Chicago Medical Recorder, vol. i, No. 5, 1891, p. 418–426.

[2] Morris: American Lancet, March, 1891.

[3] Levick: Am. Journ. Med. Sci., January, 1864, and re-publication in pamphlet form, with notes of the influenza of 1889–90.

[4] Grasset and Rauzier: Leçon sur la Grippe de l'Hiver, 1889–90; Montpellier and Paris, 1890. Monograph of 98 pages.

[5] Schmitz: Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin, 179, 1891. Cited in American Review of Insanity and Nervous Disease, December, 1891.

pains in nerves, muscles, and joints; and losses or perversions of sensation.

These symptoms and conditions, which may occur at the onset, during, or after the subsidence of any infectious or toxic disease, are those that constitute the nervous features of the prevailing epidemic.

Any attempt to classify the nervous and mental phenomena of influenza must be attended with great difficulties. There are, in the first place, symptoms and conditions that, although manifested in non-nervous organs, are directly traceable to a nervous origin; secondly, affections that would be readily recognized as properly referred to the nervous system; and, thirdly, affections occurring in nervous tissues and organs, although, strictly speaking, not nervous diseases.

I will but briefly refer to the first of these classes. I wish simply to emphasize the fact that some of the most prominent pulmonary, cardiac, and vascular affections of influenza can best be explained on neural theories. Many personal observations have led me to the conclusion, not new, which has recently been well presented by Elliott,[1] of New Orleans, that the pneumonias of influenza are often due to vasomotor paralysis; that they are, in fact, forms of blood-stasis or passive congestion from vasomotor paralysis, which in its turn is dependent upon the action of the infection upon the pneumogastric centers and the nervous system in general. A distinction can be made between the true pneumonic lung and this "grip lung," as it has been termed by Elliott.

Many disorders in various parts of the body are best explained on this theory of local vasomotor paralysis, although it is not necessary to attempt to force this explanation for all. Hemorrhages, minute or even of considerable size, occurring in diverse localities, as in the retina, membrana tympani, and internal auditory apparatus, or in the skin, or in mucous or serous membranes, may be due to deficient vasomotor tonus. Brain, kidneys, liver, or pelvic organs may suffer from forms of passive hyperemia, subacute or chronic, which are in fact due to vasomotor palsy. Occasionally, we meet with cases of vasomotor disorders of the extremities, such as flushed or pallid fingers.

Even trophic affections have been observed. Wilson,[2] for example, refers to gangrene of the lungs as one of the less common complications. Abscesses of the limbs have been recorded. Grasset records two observations of eschars occurring in young subjects in the absence of prolonged decubitus. The greater tendency in surgical cases to suppuration may have its explanation in the depression of healthful vasomotor and trophic influence.

The peculiar forms of pulse, and the uncertain or perverted action of the heart, progressing in some cases to cardiac palsy and death, are in a strict sense nervous phenomena due to paralysis, partial or complete, of the inhibitory apparatus of the heart. Tachycardia and irregularity of action of the heart may remain as sequelæ.

I shall now take up those symptoms and affections that would clearly be recognized as belonging to the nervous system.

I believe, with Church, "that the infection of influenza has a marked action upon the nervous system which may give rise to immediate acute manifestations or to remote and persistent conditions; and that, in the predisposed, grippe is competent to cause marked excitement or great depression of the motor, sensory, and mental nervous apparatus."

Great nervous and mental prostration, both as an acute manifestation and as a persisting sequel, has engaged the attention and required the treatment of all practitioners. The mental depression often present as an initial symptom has in some cases been simply overpowering. In some cases it seems as though the brain-centers had been poisoned to the limits of human endurance, consciousness, however, being preserved. In other cases, even consciousness itself has been overwhelmed.

Not a few patients that suffered from influenza during the early period of the present epidemic are still victims of profound neurasthenia. I now refer to cases that are not distinctively of the melancholic type. These neurasthenics are unable to endure an ordinary amount of work; their nervous forces are soon routed; they are weak, worrisome, and unrecuperative. The cardiac weakness that has been left is undoubtedly in part the cause of this neurasthenia.

Among organic nervous diseases that have developed during the influenza, or have been left in its wake, are, in the order of their frequency, so far as my personal observation has gone, neuritis, meningitis, myelitis, and cerebritis, or various combinations of these inflammatory affections, as, for example, concurrent neuritis and myelitis, meningomyelitis, or meningo-encephalitis.

Probably no single affection of the nervous system has been so common during and after influenza, and particularly as a sequel, as neuritis. Almost every variety of neuritis, as regards location and diffusion, has been recorded, and has come under my personal notice. Multiple neuritis, while not common, has not been rare; and I have seen an apparent concurrence of this affection with poliomyelitis in the same case. Isolated neuritis of almost every cranial

[1] Elliott: The Climatologist, vol. i, No. 1, 1891.

[2] Wilson: American System of Practical Medicine, vol. i, p. 870.

nerve has been recorded, with such resulting conditions as optic atrophy, loss of smell and of taste, ophthalmoplegias, both internal and external; oculo-motor, facial, and bulbar or pseudo-bulbar palsies of various types, including true pneumogastric paralysis. Several cases of specially located affections of the sympathetic ganglia or nerves have been recorded. Of the forms of local neuritis most common may be mentioned the supra-orbital, intercostal, sciatic, and plantar.

An interesting case of neuritis with a myxedema toid condition of the limbs presented herself at the Philadelphia Polyclinic recently, five weeks after a sharp attack of influenza. She was extremely weak in the legs, and was scarcely able to drag herself around. In a few days her feet and legs began to swell and to be painful, and soon became of enormous size and exquisitely tender. She has gradually improved, but still has a condition of firm swelling, from her knees to her ankles, which does not pit on pressure, and she also still has great tenderness on squeezing the feet or ankles, or in handling the nerves or muscles of the limbs. She has no cardiac affection.

The articular pain and other so-called rheumatic manifestations so numerous during and after attacks of influenza, are best explained on the theory of infectious neuritis or myositis.

The cases with articular and other pains, and with swelling, recall the endemic or epidemic form of multiple neuritis known as beri-beri, in which the chief phenomena are edema and paralysis of the limbs, with marked pain, hyperesthesia and paresthesia, followed later by anesthesia, loss of knee-jerk, and enfeeblement of electric reactions. Myositis certainly, and probably also periostitis, occur as complications or sequences of influenza, and usually in association with neuritis of some type.

Many of the reports speak of the frequent occurrence of various neuralgias. Doubtless a distinction is seldom made by observers and recorders between neuralgia and neuritis, which are or may be separate affections. Practically those cases should be regarded as neuralgic, in which pain is refered to certain nerve-lines or radiations; but in which pain on pressure, and other phenomena of neuritis, such as anesthesia, vasomotor, and trophic disorders, and even paralysis, are wanting. In my own experience the cases that could be properly diagnosticated as neuritis are by far the most common. The distinctively neuralgic pains are probably due to toxemically depressed or exhausted sensory nerve-roots or centers in the cord and bulb.

Of diseases of the spinal cord proper, occurring as complications or consequences of influenza, the reported cases are not numerous, but they are none the less important. A few cases of myelitis have been put on record by native and foreign observers —in one that I recall all four extremities were paralyzed. As would be expected, in accordance with the analogies with other infectious and toxic diseases, anterior poliomyelitis is the most common type. I have had several cases of temporary paralysis of one or more limbs, which, owing to the absence of pain and of cerebral symptoms, were apparently spinal in origin, and probably mild forms of inflammation.

Several observers have reported cases of bulbar paralysis, and one striking example of this disease, attributed to the influenza, has come under my own observation, although exactly how far the influenza was responsible it is difficult to say. The patient, a clergyman, soon after a severe attack of influenza, noticed that he was losing power in his hands, which soon atrophied. Some months later difficulty of speech appeared, and when the man came under my observation he presented symptoms of well-marked bulbar paralysis, with progressive muscular atrophy, chiefly involving the upper extremities.

In accordance with analogy, we would expect the occasional occurrence both of nuclear polioencephalitis, and even rarely cortical polioencephalitis. One or two of the few cases of probable polioencephalitis of the latter type have occurred in patients suddenly stricken with fever, loss of appetite, and other symptoms that may have been due to infection.

Priester[1] has reported the case of a man fifty-four years old, who was taken with influenza in February, and in the beginning of March was seized with extremely violent headache that resisted all medication; subsequently the patient became deeply somnolent, remaining so for four weeks; he could be aroused, but was apathetic and soon slept again. Reflexes and temperature were normal; the pulse was from 40 to 60. The patient had no paralytic symptoms, and slowly improved. The affection resembled paralyzing vertigo—what is described as a disease of the hot season. Tumor could be excluded by the absence of all focal symptoms a year before the attack. The most probable cause was a pathologic process involving the central gray matter of the third ventricle, so that the disease would be brought into close relation with polioencephalitis of the nuclear type. Kaumheimer has observed an exactly parallel case, which originated in April, and lasted into July before recovery took place.

That meningitis, either cerebral, spinal, or cerebrospinal, occurs during the progress or decline of influenza cannot be doubted in the light of the evidence that has been presented by various observers, and particularly during the epidemics of the last three years. It is, however, a comparatively rare

[1] Priester: Wien. med. Woch., No. 27, S. 1159.

concomitant or complication. Some of the facts adduced as proofs of the existence of meningitis, and some of the cases reported as examples of the disease, are clearly instances of improper interpretation. The intense cephalalgia and rhachialgia; the atrocious pains variously localized in the face, trunk, limb-nerves, muscles, or joints; the vigliant delirium, with hallucinations and delusions, sometimes assuming great gravity; the intense vertigo, with or without nausea and vomiting—these and other well-known nervous manifestations, which are so prominent in many cases at the initiation of the disease, are not necessarily evidences of meningitis, or even meningeal hyperemia. Rather are they due to an overwhelming toxemia of the nerve-centers and of the brain. Severe and terrible in character at first, they frequently pass away almost as rapidly as they came, which they would not do if they were the evidences of a true meningitis. The great prostration that remains shows that the centers of nervous energy have been subjected to a depressing influence of great virulence, not that merely enveloping membranes composed mainly of fibrous tissue and bloodvessels have been congested or inflamed. Nor is there reason why such congestion or inflammation should leave such results.

The reports of cases of meningitis must thus be received cautiously, and in some instances incredulously. They are only to be relied upon when confirmed by autopsies, or when made by competent and reliable observers.

It may also be worth while at this point to refer to this somewhat frequent diagnosis. A diagnosis of chronic meningitis as one of the sequelæ of influenza is sometimes made because of the presence of persistent pain in or on the head. Experience has led me to believe that this pain is usually neuritic rather than meningeal. Even deep-seated intracranial pain does not necessarily indicate meningitis. It may be due to neuritis, just as certainly as a pain in the hand or foot. The fifth nerve has an immense distribution within as well as outside the cranium, largely to the dura mater but also to other tissues and parts. It is a pathologic possibility to have dural neuritis without a pachymeningitis, and this is the true explanation of some pains, both acute and chronic, which are present in other diseases as well as in influenza.

The variety of meningitis most likely to be present in influenza is an inflammation of the pia-arachnoid or soft membranes—lepto-meningitis. From observations, corroborated by autopsies, I know that this affection may exist without pain; while pain of varying degrees of severity, and usually intense, is practically invariable in pachymeningitis. Lepto-meningitis, however, is not usually without pain and hyperesthesia as symptoms, but these may be absent; their presence or absence will depend upon the location, extent, grade, and complications of the meningitis.

While believing that these criticisms upon the sometimes hasty and the too frequent diagnosis of meningitis in influenza, and indeed in many other infectious and febrile diseases, are just, and can be sustained, it remains true that a genuine meningitis, sometimes of malignant type, may appear during the progress of or closely following influenza. Competent observers have reported cases of this character, and in a few instances the diagnosis has been confirmed by autopsies. The diagnosis should be based upon the signs and symptoms that would be satisfying as to the existence of meningitis from any cause; not alone on the presence of such phenomena as headache, vertigo, and vomiting, but on such more convincing manifestations as optic neuritis, and localized spasms or palsies, either cortical or of cranial nerves.

The fact that meningitis, and even the cerebro-spinal form, does occasionally occur in association with influenza, is by no means proof that this disease and epidemic cerebro-spinal fever are identical. It simply emphasizes the point that every infectious or poisonous agent introduced into the economy may produce the same or similar pathologic results in the nervous system. Largely according to the vulnerability, special or general, of certain tissues and organs, will be the preponderance of this or of that form of so-called disease—for instance, of neuritis, myelitis, meningitis, cerebritis, or of combinations of these affections. All infectious and toxic diseases present neuritis as the most common acute or chronic inflammatory manifestation, although myelitis, cerebritis, and meningitis may occur. Even in cerebro-spinal fever, as I was perhaps the first to point out, multiple neuritis is a common complication; but the infection being virulent and overwhelming, we may not only have meningitis but even meningo-encephalitis, or meningo-myelitis, with all of the concomitant malignant phenomena and permanently disastrous results.

Vertigo, like pain, is another symptom, often improperly referred to meningeal or cerebral inflammation. It is sometimes due to such disease, but occurring in influenza it may arise from other causes, as, for instance, from extravasations into the labyrinth or other portions of the auditory apparatus, or from profound cerebral exhaustion.

Müller[1] reports the case of a man fifty years old, who after an attack of influenza presented great physical exhaustion. In a few weeks his mind seemed affected and he became somnolent, so that he could be roused only with difficulty and would

[1] Müller: Berlin. klin. Woch., No. 37, 1890. Cited in American Journal of Insanity and Nervous Diseases, December, 1891.

then fall asleep again. Pain was present upon pressure over the vertebræ; the neck was rigid; the pulse was small and irregular; the skin-reflexes were diminished; and the tendon-reflexes were absent. In two weeks he began to improve. It is believed that the case was one of cerebro-spinal meningitis, such as is seen after infectious diseases.

Without entering into a discussion of their pathology or their peculiarities, I shall briefly mention a few other forms of nervous disorder, occurring during the course of, or apparently as sequelæ of influenza, examples of which have come under personal observation. Various observers have reported the occurrence of convulsions. In a few instances the convulsive habit has been established, and the patients have remained up to the time of report as cases of epilepsy. I have seen two such cases. Hystero-epilepsy and other grave hysterical phenomena have been initiated by an attack of influenza, or have recurred in cases in which the symptoms had long been dormant. Of local spasmodic affections I have seen no records; but one case of persistent clonic torticollis, with some pain and tenderness in the distribution of the spinal accessory nerve, has been in attendance at the Philadelphia Polyclinic. Two cases of facial paralysis, occurring immediately after an attack of influenza, have come under observation.

Many affections not of, but occurring in, the nervous system have been reported as complications or as sequences of influenza. These include such affections as apoplexy, due either to hemorrhage, thrombosis, or embolism. A patient at the Polyclinic, a man thirty-seven years old, a month after an attack of influenza in which he was not confined to bed, but suffered severely from headache, cough, and persistent general weakness, was suddenly paralyzed on the right half of his body, and became completely aphasic. Well-marked cardiac murmurs were present. In this and similar cases, influenza is probably causative by lighting up old endocardial trouble, or in consequence of the blood dyscrasia and general prostration that it leaves.

Various observers have reported cases of monoplegia and hemiplegia, without indicating their pathologic character.

I recently saw, in consultation, a typical hemorrhagic apoplexy in a case of influenza in a woman about sixty years old, who had previously been in fair health, and was not known to have had any disease of the kidneys or heart, although her vessels were somewhat atheromatous. Prentiss[1] has reported three cases of cerebral apoplexy occurring during the progress of influenza; one was in a man fifty-seven years of age; another in a man of eighty-seven; a third in a woman of sixty-seven. At least one of these was hemorrhagic; the other two were probably thrombotic. In cases of this character the infective agent predisposes to the occurrence of apoplexy both by the changes in the blood to which it gives rise, by its effects upon cardiac action, and by the general debility induced. Such apoplexies might occur from other depressing causes; they are to be regarded not as phenomena, but rather as accidents of the epidemic.

Uremic convulsions in patients suffering from chronic nephritis have been precipitated by an attack of influenza. It has also seemed to me that influenza has been active in lighting up latent syphilitic taint.

In one case of paretic dementia of somewhat irregular type, seen in consultation, the initial symptoms of the disorder were observed soon after recovery from a severe attack of influenza, the wife and friends of the patient, in fact, attributing the mental disorder to this attack. The probabilities are that syphilis was present, but latent, prior to the epidemic.

Purulent meningitis and brain-abscesses have been somewhat frequently noted in connection with the numerous instances of purulent otitis media.

The relations of influenza to insanity have not received much attention from writers.

The following conclusions compress into small compass so much that is valuable with reference to the relation between influenza and the psychoses, that I cannot do better than quote them. They are reported as the conclusions arrived at by Dr. Leledy, and were presented to the Medical Society of London by Dr. Savage:[1] "1. Influenza, like other febrile affections, may establish a psychopathy. 2. Insanity may develop at various periods of the attack. 3. Influenza may induce any form of insanity. 4. No specific symptoms are manifested. 5. The rôle of influenza in the causation of insanity is a variable one. 6. Influenza may be a predisposing or exciting cause. 7. In all cases there is some acquired or inherited predisposition. 8. The insanity is the result of altered brain-nutrition, possibly toxic. 9. The onset of the insanity is often sudden, and bears no relation to the severity of the attack of influenza. 10. The curability depends on general rather than on special conditions. 11. The insane are less disposed to influenza than are the sane. 12. In rare instances, influenza has cured psychoses. 13. The insane may have mental remissions during the influenza. 14. There is no special indication in treatment. 15. Influenza may lead to crimes and to medico-legal issues."

I can indorse from experience almost every one

[1] Prentiss: THE MEDICAL NEWS, August 29, 1891.

[1] Savage: Lancet, No. 3558, and THE MEDICAL NEWS, January 16, 1892.

of these conclusions. With reference to the statement that no specific symptoms are manifested, it should be said, however, that while this in a general sense is true, the most frequent type is a form of melancholia.

Active insanity has been observed at the onset of influenza and during its height, but more particularly during its period of decline and convalescence. The published cases have been recorded chiefly as instances of acute mania or melancholia. The commonest type of influenzal mental disorder, as I have just stated, is a form of melancholia or lypemania; but as this not infrequently assumes the form of melancholia agitata, it is often regarded as mania by practitioners not accustomed to differentiate the varieties of insanity. The patients are intensely depressed and emotional; they are filled with apprehensions of disgrace and ruin; they believe that they will never recover their former health; they are suspicious and delusional with reference to those that surround them; they are frequently unwilling to eat, or to rest, or to take medicine; and in some cases they have definite delusions of terrible character, for the most part hypochondriac or religious. They are frequently plagued with the thought of suicide, and sometimes make successful or unsuccessful suicidal attempts. They have been deprived by the ravages of disease of mental and moral stamina. In the majority of cases, but not in all, there is some hereditary or acquired predisposition. While, however, influenza usually gives rise to mental disorder of special type —a form of delusional melancholia—under special conditions it may be, as stated by Savage, the starting-point or exciting cause of any variety of mental disorder, such as mania, paranoia, paretic dementia, hebephrenia, etc.

K. Helweg[1] has recorded the results and action of influenza in the Asylum at Aarhus, Denmark, of which Pritchard has prepared a summary for the *Review of Insanity and Nervous Disease*, for December, 1891. The disease appeared in the asylum January 4th, a few weeks after it had first been observed in the neighborhood. Of 520 insane, 41 were so severely attacked that they were confined to their beds. The disease seemed decidedly contagious. It spread with difficulty, as the wards were divided one from another. Eight of the twenty-five wards were spared altogether. When a ward was invaded, the disease would rapidly run its course, to proceed to another. The transmission of the contagion could be distinctly observed in the sick wards to which those stricken down in the other wards would bring the disease and transmit it to patients. Seven patients had pneumonia. A relatively large percentage (six) died; four deaths were from pneumonia. The most constant pathologic lesions were extreme hyperemia of the cranial bones and membranes, the dura and the brain-mass itself in two cases presenting recent and high vascular pseudo-membranes containing small hemorrhages. The veins and arteries of the thinner cerebral membranes were greatly distended with blood; the large basal arteries were so filled with coagula that they stood out like cords, or like those of an injected specimen. The brain-substance itself was hyperemic and its consistence increased. The average weight of the brains was about the ordinary weight of those of Aarhus.

In the case of a sane nurse that died of pneumonia complicating influenza, there was great hyperemia of the brain and its membranes, yet not so pronounced as in the cases fatal in the insane. In a few cases in which influenza was accompanied by severe psychic symptoms, the condition resembled acute delirium. The symptoms are, however, transient, and seem easily controlled by antifebrin. On the other hand, in two hopeless cases of insanity, influenza had such a favorable and curative action that they may be regarded as cured. In both cases there was pneumonia.

Epidemic influenza has impaired the *morale* of the community. Lack of spirit in work, and an apprehensiveness with reference to health, business, and all matters of personal interest have been abnormally prevalent. The hysterical have become more hysteric; the neurasthenic more neurasthenic. Hypochondria has displaced hopefulness in individuals commonly possessed of courage and fortitude. In brief, certain neuropathic and psychopathic features have been impressed upon the community. We cannot afford even to dismiss entirely from consideration the bearings of the epidemic upon the increase not only of suicides, but of other grave crimes.

The use in influenza of hypnotics, narcotics, sedatives, and motor depressants is a question of particular interest in connection with the study of the nervous and mental phenomena of the disorder. The views of practitioners and writers are here decidedly at variance. Serious mental and nervous complications, or actual insanity occurring during influenza, have been attributed to the too free use of such chemically powerful remedies as phenacetin, antipyrin, antifebrin, chloral, bromides, sulfonal, and paraldehyde; and our older narcotics, such as opium, hyoscyamus, conium, and cannabis Indica, have also come in for a share of blame. Persisting conditions of nervous prostration, and chronic respiratory and cardiac neuroses, have also been charged to drugs. Undoubtedly, such criticisms have some foundation, but it remains true that each of the

[1] Helweg: Hosp. Tidende, R. 3, Bd. viii, S. 729.

remedies named has proved itself of some value in the treatment of influenza, and particularly of its nervous types. The enormous consumption of a drug like antipyrin is a practical argument both for and against its use. What Grasset has said of this remedy might with almost equal truth be said of almost any of the rest. "This agent," he says, "vaunted by some as a panacea for all the manifestations of the disease, is considered by others a remedy absurd and irrational in all cases. The truth would seem to reside between these two extreme opinions."

IN RE HYDROGEN DIOXIDE.

BY SAMUEL S. WALLIAN, A.M., M.D.,
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THE medical press, both at home and abroad, has of late frequently devoted considerable space to discussions concerning the value of this by no means new, but quite unique and not very well understood, product of the laboratory, considered as a candidate for antiseptic, disinfectant, and germicidal honors; yet, in giving their experience, few writers have taken the pains to furnish anything like definite details as to its chemical nature and reactions, or any practical rules for testing either its purity or volumetric strength. Some years ago I had the honor to read a paper on this agent before the Medical Society of the State of New York,[1] which was listened to with somewhat less than the proverbial apathy of such over-bored annual gatherings, not on account of any unusual literary or scientific merit, but from the novelty of the subject. Very few members of the profession in this country had at that time given the subject any attention whatever, and very many are still unaware of the great value and prospective importance of this as yet unofficinal preparation, in its possible relations to hygiene, prophylaxis and therapeutics. The popular and pharmaceutically prevalent name, *peroxide of hydrogen*, under the chemical nomenclature of to-day is a palpable misnomer and ought to be summarily dropped. It will, doubtless, cling to the product until manufacturing chemists cease to use it on their labels. The compound is a dioxide or binoxide—water being a monoxide—of hydrogen. It is, therefore, *oxidized water*, French authorities still retaining the name "*l'eau oxygenée.*"

The chemical affinity artificially induced between water and the extra equivalent of oxygen, which transforms it into hydrogen dioxide, is not a strong one, but is rather easily broken up by a variety of comparatively slight causes. Hence the proverbial instability of the product. In a pure or, rather, undiluted state, it can scarcely be handled at all, the slightest cause, such as moderate elevation of temperature, agitation, metallic contact, and other accidental and apparently trivial agencies precipitating its decomposition into water and free oxygen, sometimes with explosive violence. By such decomposition it is found to yield 475 times its own bulk or volume of liberated oxygen. Pure, undiluted hydrogen dioxide is, therefore, called 475 volumes strong, and the strength of any solution or dilution of it is estimated according to the volumes of oxygen it will yield when entirely decomposed. Practically, it is found that a solution stronger than from 3 to 4 per cent. (about from 14 to 19 volume) is as strong as can, with our present chemical knowledge, be made reasonably stable. In a therapeutic sense it is quite as strong as is ever required—in fact, even this strength needing to be much further diluted for most clinical uses.

The market is now tolerably well supplied with indifferently good and wretchedly poor varieties, a really ideal product being hard to find. It would seem that as the article has increased in popularity manufacturers have grown either careless or mercenary, and have allowed their product to deteriorate in quality. Competition, it would appear, has not yet reached a stage in which quality is of greater moment than quantity; but as the profession learns to discriminate, the inferior varieties will fall into deserved disrepute and be driven from the market. For the most part the current medical journal literature on the subject is so transparently instigated, or at least influenced, by "trade" bias that it commands comparatively little professional confidence, and many who have been theoretically convinced that the article itself has intrinsic therapeutic value have been discouraged from continuing its use on account of the difficulty of procuring a preparation possessing the requisite degree of purity and stability. In a purely economic sense, instability is a prime obstacle to the general introduction and ultimate popularization of this article in medical and surgical practice. To be always trying to remember the stereotyped precautions of tight corking, cool storage, and seclusion from light, is always irksome and frequently impracticable; while to find, at a critical juncture, too late for rectification, that a quondam fifteen-volume solution, from having been set aside for a few weeks, has degenerated into a three-volume or five-volume solution, is not only very aggravating, but in all probability compels a resort to less satisfactory substitutes. To the painstaking and inquiring surgeon this is a loss, not only of substance but also of opportunity. If to its delusive instability is added a decidedly irritating quality from retained impurities, it is little

[1] Trans. N. Y. State Med. Soc., 1885, p. 94–99.

wonder that many practitioners and impatient experimenters have almost wholly abandoned its use.

The commonest impurity noted in samples of H_2O_2 is hyperacidity. The pure product itself has a slightly acid reaction, reddening sensitive litmus paper; but the presence of free acid in appreciable quantity is a serious fault, whether the agent is to be used internally or externally. Most manufacturers purposely acidify the solution, and they do this on the theory that it is necessary in order to secure a stable article. This theory is, in reality, a chemical absurdity and delusion. Every reflecting chemist must admit that the presence of free acid in any compound solution is a menace to the permanency of its chemical composition, especially if there be present at the same time traces of earthy or mineral salts. Again, if these salts be present in any such solution, then a certain percentage of free acid becomes a necessity in order to prevent their precipitation. In any solution containing both mineral compounds and a free acid or acids, the inevitable tendency is to further chemical reactions and a resultant change in the chemical relations of the solution. This may be an unwritten law as regards text-books, but it is based on the general law which underlies all chemical facts. Thus, the salts of barium, incident to its manufacture, when not thoroughly eliminated from a given sample of hydrogen dioxide, call for a certain proportion of some free acid, in order to render the solution clear and free from a tendency to unsightly deposits. Some manufacturers resort to various expedients to render their product unusually brilliant and attractive in appearance. Sulphate of aluminium is the least harmful, and oxalic acid the most objectionable, of the many contaminations used for this purpose.

Until manufacturers of this compound cease to resort to laboratory subterfuges to cover up the shortcomings of their wares, we shall continue to encounter impure, unstable, and irritating preparations, notwithstanding the fact that they may be widely advertised and loudly labelled "medicinal," "strictly standard," "chemically pure," etc. Dr. B. W. Richardson, who has done more than any other writer to make known the valuable properties of H_2O_2, now insists[1] that acid, and otherwise impure solutions, are no longer tolerable—in other words, that the chemists must give us a genuinely neutral product, and one that will not deteriorate as to volumetric strength from other than extraordinary causes. This is not an unreasonable demand. Chemistry is a rapidly progressive science. Our synthetists fabricate quinine, saccharin, and an endless list of antiseptics and antipyretics from simple coal-tar. Our analysts split the most obscure ptomaïnes, glucosides, and alkaloids into their ultimate elements. Why should they blunder, or be only partially successful, in their efforts to combine the two commonest elements in nature?

In this connection it is no exaggeration to say that those manufacturing chemists who essay to make peroxide of hydrogen, and who are so eager to control and extend the trade in this product that they lose sight of the maxim, *In medicine only the best is good enough*, will learn, too late perhaps, that they have ruined their own market. In other words, if this bland but unique and powerful agent is to become widely known and permanently popular with either physicians or surgeons, its promoters and fabricators must cease to rely on "chemically pure" label assertions, and give to the profession a uniform preparation that is at once practically non-acid, of definite and reliable strength, and that can be retained, without rapid deterioration, under ordinary office temperatures and conditions.

This unquestionably involves the most exact manipulation and an unusual degree of chemical vigilance; but it can be done, since it has been done, and the perfect and finished product is certainly worthy the pains. The spirit of the profession is growing intolerant of anything short of the best results that pure chemicals, trained knowledge, and the most rigid accuracy in manipulation make it possible to produce. There is quite enough inaccuracy and uncertainty in the practice of medicine without any crudity or carelessness in the matter of pharmaceuticals.

To test any sample of hydrogen dioxide with sufficient accuracy for all practical and clinical purposes requires but little apparatus and a modicum of chemical tact. Every physician can make his own tests with little trouble and less expense. The requisites include a few test-tubes; a pipette holding, or at least graduated to measure, 1 c.c.; a cylindrical graduate, marked in c.c.; a glass or porcelain bowl, with a capacity of a pint or more; a small glass rod, or piece of glass tubing, for stirring; strong aqua ammoniæ, phosphoric and sulphuric acids, and a standard solution of permanganate of potassium, one part to 250 of water.[1]

Certain preliminary tests can be promptly made by the aid of the senses, without any apparatus. Thus, on opening a fresh sample of the article, if the cork be ejected with force, as if the bottle contained soda-water or champagne, it is proof positive that the contents are in a state of decomposition, and it is *prima facie* evidence that the sample contains either

[1] London Lancet, March, 1891.

[1] It is directed that 1.852 gram of permanganate be dissolved in 500 c.c. of water, which corresponds with 1 part in 270, and will, of course, indicate a proportionately greater strength in any sample tested.

free acid or some form of impurity, or both. Holding the bottle to the light, the constant rising of minute bubbles of gas to the surface will confirm the foregoing evidence, and indicates decided instability. The presence of certain free acids will be evident to the sense of smell, but particularly so to the taste. Pure H_2O_2 is not distinctly acid to the taste, but imparts a sense as of metallic contact, or of mild galvanic action. By comparing several samples the differences will be very apparent. One liter of a fifteen-volume solution should be entirely neutralized by 6 c.c. of a 10 per cent. normal solution of ammonia of 20° Baumé. If more than this is required to prevent decided reddening of blue litmus paper, either free or combined acid is present.

The volumetric test is as follows: To half a pint or more of water contained in the glass or porcelain vessel mentioned, add twenty or thirty drops of sulphuric acid; then with the pipette add exactly 1 c.c. of H_2O_2, stirring the mixture thoroughly with the glass rod. Fill the cylindrical graduate (which should read downward) up to zero, with the standard solution of permanganate of potassium, and pour from it slowly into the bowl of accidulated water containing the H_2O_2 to be tested, stirring the mixture rapidly until the color of the permanganate is no longer discharged, taking pains not to add more than a drop or two beyond the exact quantity required. The number of c.c. of permanganate solution used indicates the volumetric strength of the sample. Thus, if in a given case 10 c.c. of permanganate solution is decolorized by 1 c.c. of H_2O_2, the latter is said to be of ten volumes strength. In other words, such a sample, on being completely decomposed, will yield ten times its own bulk or volume of free oxygen.

To detect the presence of barium and other earthy compounds, which, as a rule, are but imperfectly removed by even the most reputable manufacturers, here or abroad, proceed as follows:

To half an ounce or more of H_2O_2, in a perfectly clean test-tube, add a few drops of phosphoric acid, to favor perfect solubility. Shake well, and then add ten or fifteen drops of strong aqua ammoniæ. On agitating the mixture effervescence will occur, and oxygen will be somewhat rapidly liberated. If there be appreciable quantities of earthy salts in the sample it will turn decidedly milky, and on standing will precipitate a flocculent deposit, which will be more or less abundant, according to the degree of impurity. This test will be more thorough and reliable if the solution be heated nearly or quite to boiling-point before adding the ammonia. If neither a cold nor a hot solution thus treated shows the cloudiness or deposit, it may be considered free from any notable quantity of chemical salts. This test is by no means quantitatively accurate, but it answers for practical purposes, and applies equally well for the detection of nitrates, sulphates, phosphates, or chlorides.

As a practical application of the foregoing, I have before me five different brands of the so-called "peroxide of hydrogen." Four of them are of American and one of German manufacture. Three of them claim to be "chemically pure," and fifteen volumes strong. One is marked ten volumes, and one makes no claim as to strength or purity. To secure exact fairness in the test, all the samples were freshly procured.

No. 1 bears the foreign brand, is put up in an amber bottle, and marked ten volumes. On releasing the cork it is ejected with moderate force, and fine bubbles of gas are seen to rise. The permanganate test indicates a strength of eight and a quarter volumes. The ammonia test, cold, throws down an abundant flaky deposit, as if one had added tincture of camphor to cold water.

No. 2 is contained in a long-necked bottle, similar to an Apollinaris bottle, the sample having ample space above the liquid, which space, the label asserts, is "necessary for expansion." It is marked "fifteen volumes, medicinal." On releasing the strongly wired-down cork it is forced out with a distinct report, and effervescence is brisk and constant. The taste is sharply acid, and holding a teaspoonful in the mouth for a time fairly sets the teeth "on edge." The permanganate test shows thirteen and a half volumes, and the cold ammonia test instantly changes the previously clear and beautiful solution into an opaque, milky fluid, which soon throws down a copious, flocculent deposit.

No. 3 is contained in a common amber glass bottle, full to the neck, and claims to be fifteen volumes in strength, and "free from hyperacidity and earthy salts." There is no force behind the cork, and the appearance of the liquid poured out into a clean test-tube is not as brilliant as the last-mentioned sample. The taste is metallic, but not acid, although the sample reddens sensitive litmus. The permanganate test shows seventeen volumes strength, and even on heating the solution the ammonia test causes no perceptible cloudiness. It is apparently an unexceptionable product, which proves that there is no insuperable reason why all the others should not be equally good.

No. 4, contained in amber glass, bears the imprint of a heavy and highly reputable wholesale drug-house, but claims nothing as to volumetric strength, purity, or medicinal qualities. It tests barely one and a half volumes, and contains a marked percentage of free acid and of chemical salts. It is the poorest, not to say vilest, of all the samples tested.

No. 5, put up in flint glass, ejects its cork with

force, and while it is a beautifully clear and brilliant preparation, is sharply acid to the taste; it claims to be a "standard" solution, fifteen volumes strong, and tests but twelve volumes. The cold ammonia test produces no milkiness, but on heating the solution a slight cloudiness appears. This sample seems to be fairly good, except that it decidedly lacks stability.

Thus it will be seen that there is a wide and seemingly inexcusable margin of difference between these various samples, but two of them being passably good, and but one of them bearing out the claims contained in the attached labels and circulars. That anything like uniform or satisfactory therapeutic results can be expected by an indiscriminate use of these several brands is absurd. On the contrary, it is surprising that so many physicians and surgeons have been able to report favorably concerning the use of an agent that averages so bad a record in the direction of careless or unscientific preparation.

THE USE OF GOLD AND MANGANESE IN TUBERCULOSIS.

BY O. H. MERRILL, M.D.,
OF CORINNA, ME.

THIS report is based upon five months' experience in the use of hypodermatic injections of gold and manganese in cases of pulmonary tuberculosis. Ten patients have now been under observation for a sufficient length of time to enable at least a provisional opinion to be formed as to the value of this method of treatment, as advised by Dr. Blake White. Other cases, in which only a few injections were made, or which, for some cause, could not be followed, will not be considered here. Over 350 injections have been given, of which one patient received ten, another fifty-eight, while the others had between thirty and forty each. The rules laid down by Dr. White in his original publication have been followed as closely as possible, and it may be said that, in general, his statements have been confirmed. The use of the remedy does not require any special skill, and is not attended by any particular danger, if proper precautions and care are taken.

The injections were made in the arms and legs with an ordinary hypodermatic syringe provided with a very fine needle. No abscess has been caused, and only occasionally has pain or swelling followed. In only one case was there any unpleasant "reaction," namely, increased cough, with bloody expectoration. This, however, was slight, subsided in a few hours, and did not reappear on further use of the remedy in slightly diminished doses. The patients have all followed their usual occupations while undergoing the treatment. For the sake of brevity, the detailed histories of the cases will not be given. The diagnosis was established beyond a doubt by modern methods. Before beginning the injections, all the patients had been treated for some time, with rather indifferent success, by means of special diet, hygiene, creasote, and in a few instances, cod-liver oil. These various measures were also continued during the period in which the injections were used.

The first patient to receive the gold and manganese treatment was a machinist, twenty-five years of age, with incipient phthisis.

In spite of six weeks of active treatment, there was an evening temperature of 99½°, a pulse of 84, and considerable cough. As these symptoms showed the usual tendency to persist, it was decided to use the injections. In less than three weeks every symptom had disappeared, and now, four months afterward, he is apparently well. He declared that the injections cured him, but, of course, the declarations of patients can have little weight in such matters.

In the case of a woman, thirty-two years of age, with advanced disease of one lung of eighteen months' standing, the remedy seemed to arrest her downward course very promptly. After two months of faithful use an intermission of a fortnight was ordered, at the end of which time she returned much worse and begged to have the remedy administered again. Her request was granted, whereupon she rapidly improved once more. There seemed in this case to be some probability that the special treatment really had the good effect that she attributed to it.

The other eight patients were in the first stage of pulmonary tuberculosis, with distinct, though not extensive, consolidation of some part of one lung. The improvement was well marked in every case after from ten to twenty injections had been given. Appetite, weight, pulse, temperature, cough, and sweating all showed changes in the right direction. Several of these patients declare themselves well, and refuse further treatment. That they are not well is shown by a slight elevation of pulse and temperature in the evening, by a slight morning cough, and by the occasional presence of a few bacilli in the scanty sputum. These symptoms, together with a certain degree of dulness on percussion, make it sufficiently plain that further treatment is needed. It must be admitted, whatever the final results may be, that the changes in their condition have been remarkable and altogether unexpected. That most of them will relapse seems highly probable from the fact that they have not sufficient intelligence to continue systematic treatment, and from the fact that owing to lack of means they cannot have the benefit of favorable climatic influences. What the result might be with continued medical care in

a suitable climate cannot, of course, be definitely stated.

The wild and baseless announcements that have had premature delivery during the past year show how difficult it is for even well-trained minds to draw correct conclusions in regard to therapeutics. They show, furthermore, that proclamations from the laboratories may as well be tested clinically before acceptance.

In attempting to form a correct opinion in regard to the value of this mode of treatment, reliance is placed chiefly, but not entirely, upon the results obtained this year with the combined treatment as compared with the results obtained during the past ten years with an entirely similar series of cases treated without the injections. This comparison is very favorable to the new treatment. An improvement that required six or eight months to bring about in former years, has been obtained this year in as many weeks. Symptoms that were formerly very obstinate, and that were removed with the greatest difficulty, have this year yielded quickly. One of the most gratifying effects of the remedy was seen in the increased appetite that sometimes manifested itself within a week—nearly always in two weeks. Although, on account of the small number of cases treated and the short time they have been under observation, it is impossible to make any complete demonstration, yet it seems probable that, after all the deductions that strict logic requires have been made, the remedy has considerable power to ameliorate the condition of tuberculous patients, and in incipient cases, perhaps, to do more. While we have here no specific, we have a remedy that, when used carefully in connection with other means, is capable of doing excellent service, thus constituting a distinct advance in the therapeutics of tuberculosis.

CLINICAL MEMORANDA.

A CASE OF TUMOR OF THE MID-BRAIN AND LEFT OPTIC THALAMUS.

BY JAMES HENDRIE LLOYD, M.D.,
PHYSICIAN TO THE NERVOUS AND INSANE DEPARTMENT OF THE PHILADELPHIA HOSPITAL, TO THE METHODIST EPISCOPAL HOSPITAL, AND TO THE HOME FOR CRIPPLED CHILDREN.

THE patient whose case I report was admitted to the Philadelphia Hospital on May 13, 1891. A very brief and imperfect history was obtained from his sister. They were Italians, with very little knowledge of English. C. B., male, aged twenty-eight, Italian laborer, was taken ill six weeks before admission to the hospital. His first symptom was paralysis of the right arm; fifteen days later he complained of severe headache on the left side; at the same time his left eyelid began to droop. No other details of any importance could be obtained from the sister.

Condition on admission. The patient's attention could be attracted, but was held with difficulty. This hebetude continued throughout the case, toward the end deepening into a light coma. The left third nerve was paralyzed, as shown by ptosis and external strabismus. The pupil was immobile, but at this time not dilated. The right arm was completely paralyzed; the right leg was paretic, but not completely paralyzed, as the patient, by repeated urging, could be induced to move it. The left arm and leg were not paralyzed and never became so. The patella-reflex of the left leg, however, was exaggerated and there was slight ankle-clonus. Neither of these were present on the right or paralyzed side. The case thus presented a crossed paralysis, the left third nerve being involved, with right brachial monoplegia and right crural monoparesis. The face and tongue were not paralyzed on either side—in fact, from beginning to end no paralysis of the fourth, motor branch of the fifth, the sixth, the seventh, or any other cranial nerve than the third was observed. The patient chewed his food mechanically and swallowed without difficulty.

An Italian interpreter on one occasion said that the patient's speech was not "straight," but this defect was apparently not a true aphasia. The patient vomited occasionally, but vomiting was never a marked symptom. The bladder was not paralyzed. The sensory tests were not at any time satisfactory, owing to the patient's hebetude. Some interesting observations of a rather unusual kind, however, were made. There was no apparent anesthesia of either side, so far as the patient's mental condition allowed of a test. There was, however, an active reflex to sensory irritation. This reflex was free on the left side and was excited by irritation of the skin of the right leg; in other words, there was a transmitted reflex on the left or unparalyzed side from sensory irritation of the right side. Irritation over either the right or the left eye caused a reflex movement in the left or unparalyzed leg. The reflex to painful impressions was more marked in the upper part of the face than in the lower part of the face and showed itself by jerks of the arm and leg. The patient's hebetude gradually increased; he complained of pain in his head, and held his hand to his head as if in pain. Occasional vomiting was noted. He was very restless and delirious at night. Examination of the urine showed a very slight trace of albumin. At the end of the first week the patient had some difficulty in swallowing; his right leg became more paretic, and he could be aroused with difficulty. This general condition, continued, with increasing hebetude, occasional vomiting and constipation of the bowels. The paralysis of the third nerve and of the right arm and leg continued unaltered. The left pupil became more dilated. The right third nerve never became involved, which, considering the site of the tumor, is rather remarkable. Later, the right face became possibly a little flattened. Three weeks after admission conjunctivitis in the right eye was noticed, with increased lachrymation, but the movements of the eye were unimpaired. Sensory tests of the right eye were not satisfactory. It was thought, however, that the conjunctivitis may have been neuroparetic in origin, as there seemed to be loss of sensation of the conjunctiva of this eye. There was also an abrasion of the conjunctiva of the right eye over the lower part of the cornea. The eyes were

washed with a solution of boric acid and eserine. Two days before death the pupil of the right eye was contracted to a pin-point, while the pupil of the left eye was much dilated. Just before death the patient had a clonic spasm of the left leg. He died on the twentieth day after admission.

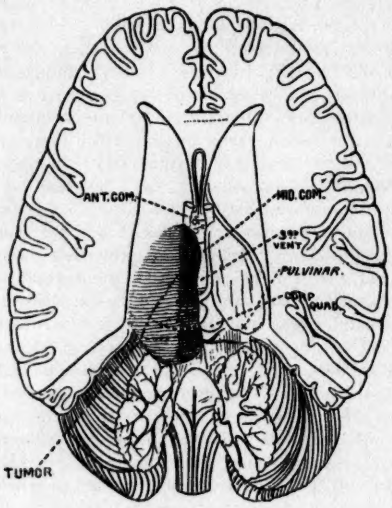
Autopsy. The autopsy revealed a tumor of the left optic thalamus and the mid-brain, involving the left cerebral peduncle. The left cerebral peduncle was enlarged and the left third nerve was displaced by the growth. The right peduncle and the right third nerve were normal. The tumor extended forward, involving and obliterating the corpora mammillaria. The optic tract was slightly flattened and broadened. On laying open the brain-axis, by carefully removing the corpus callosum and the arch of the fornix, the tumor was seen to extend forward and to involve a large part of the left optic thalamus, which projected far across the third ventricle; it also projected up into the lateral ventricle. The aqueduct of Sylvius was pervious. On section, the growth was seen to be a soft, highly vascular, infiltrating tumor. A section was prepared by Dr. Stengel, and the growth was found to be a glioma.

It seems impossible for this tumor not to have involved the sensory tracts to a greater extent than was demonstrable at the bedside. For instance, the patient probably had had hemianopsia. Careful tests were made to detect this condition, without satisfactory results, owing to the impaired mental condition—so, too, the tests for tactile and painful impressions could not be relied upon. The prominent symptoms were the crossed motor paresis, the headache and hebetude, increasing to coma. It is especially notable that the patient at no time had an epileptic convulsion, and that the vomiting was infrequent and not characteristic.

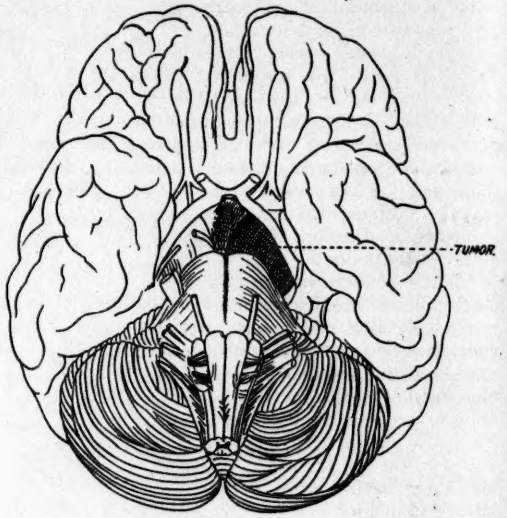
Temperature. The patient had a remarkable course of subnormal temperature, the lowest point reached being 95.4°. The temperature was subnormal for twenty days, with two exceptions, when it rose to not quite 100°. There was a difference between the temperature of the two sides, the temperature of the right or paralyzed side being usually from one and a half to two degrees higher than that of the other. Three days before death the temperature began to rise; just before death it registered 106.1°. I have noted subnormal temperature in one other case of brain-tumor. There was no vasomotor paralysis, unless the difference in in the temperature of the two sides indicated such. There was no unilateral sweating. The bladder-symptoms, as involuntary passage of urine, could be explained by the patient's mental condition.

A diagnosis of tumor of the left cerebral peduncle was made at the first examination.

I am indebted to Dr. Frances S. Janney, resident physician, for careful notes of the case.



Tumor, involving left optic thalamus and left half of mid-brain. (Seen from above.)



Tumor, involving left crus and extending forward and inward, involving and effacing corpora mammillaria.

A PECULIAR CASE OF PROBABLE PERFORATION OF THE APPENDIX VERMIFORMIS.

BY M. ROSENHEIMER, M.D.,
OF MILWAUKEE, WIS.

ON August 9, 1891, I saw Max R., aged fourteen years, of German parentage. He had had several loose passages, after which pain developed in the umbilical region. There was marked tenderness in the ileo-cecal region, vomiting, and considerable tympanites. The temperature was 99.5°, and pulse 110. Not being able to come to any definite conclusion, I administered a dose of morphine, which afforded relief. On the following morning, the condition of the boy being about the same as on the previous day, I ordered thirty grains of calomel, in divided doses, to be followed by a dose of castor oil, if the bowels did not act in six or eight hours. In the afternoon of the same day, the bowels had not moved;

there was considerable pain, and tympanites was greatly increased. I gave an injection of warm soap-water, bringing away a small quantity of light-yellowish fecal matter. Vomiting being now quite obstinate, I gave small doses of morphine and belladonna.

I made a diagnosis of bowel-obstruction, and asked for counsel. Dr. Earles saw the patient with me, and concurred in the diagnosis. The parents were informed of our conclusion, and an operation was proposed. They consented, but, as a last resort, several doses of compound jalap powder, each of one dram, with five grains of calomel and one-quarter grain of elaterium, were administered, with no result.

On the following morning the patient was removed to Trinity Hospital, and prepared for operation. However, just previously to the time set for the operation, he went to stool, and had a copious liquid movement, with considerable relief of the pain and tympanites. He was ordered magnesium citrate one dram every hour for six hours. He had several more liquid movements and felt easier, with decided tenderness, however, still present in the ileo-cecal region. He returned home. I saw him again on the following day. His pain had increased and his temperature was 100.5°, pulse 120. He received small doses of anodynes, and his condition not improving, a collection of pus was suspected, and the propriety of its evacuation suggested to the parents. After some hesitation, their consent was granted. At about this time, another medical gentleman was incidentally called in, who pronounced the case one of peritonitis, and advised a radical change of treatment. His advice, however, was not accepted, and on the following day, the patient having again been removed to the hospital, I made an incision over the cecum, and when the peritoneum was reached a hypodermatic needle was inserted. Pus having been found, an opening was made, and about an ounce was evacuated.

The pus had no fecal odor, and was confined in a cavity in which neither foreign body nor the appendix was found. Drainage was provided for and an antiseptic dressing applied. The patient did well until the fifth or sixth day, when there was a reappearance of the symptoms that had existed—obstruction, pain, tympanites, elevated temperature, and accelerated pulse-rate. The pain was localized in the hypogastric region, about an inch to the right of the median line. The boy was anesthetized, an incision was made and about two ounces of fecal-smelling pus were evacuated. A large drain was and the patient was put to bed.

He again did well for a week and we began to consider our troubles over, when the old symptoms reappeared, the pain being now localized in the left groin. Unyielding constipation again existed and there was great tympanites. The temperature rose to 102.5°; the pulse was 144 and weak. The pain was severe, and collapse seemed imminent. The patient was given hypodermatics of morphine and was vigorously stimulated. Magnesium sulphate was also administered every two hours.

On the following day (Sunday), two weeks and four days after the first operation, the condition of the boy having somewhat improved, he was again anesthetized and an incision was made, evacuating about one ounce of pus, having no fecal odor. At the same time the middle wound was dilated, and we tried to force water from the old into the new opening, but not the slightest communication existed.

The patient reacted well from the third operation and has steadily improved up to date (October 1st), at this time being completely restored to health.

REMOVAL OF TUMORS OF BOTH OVARIES.

BY ALEXANDER FULTON, M.D.,
OF PHILADELPHIA.

THE patient was Mrs. E. H., of Minneota, Minn., who came to Philadelphia to have the operation performed. Several days after her arrival, which was on the 3d of last October, after a continuous journey of two thousand four hundred miles, her symptoms were such as to imperatively demand the operation, which was done on October 13th. Observing thorough antiseptic precautions, I made an incision about three inches in length, and in depth to the aponeurotic tissue. When hemorrhage had ceased, I placed the woman on her left side and made an opening into the peritoneum. There was now a great gush of ascitic fluid. The peritoneum was incised, and a tumor of the right ovary presented. I tapped the tumor in several places, but it was still so large that I had to extend the opening four inches more. The tumor was free, and, bringing it through the opening, I transfixed the pedicle with carbolized silk and excised the tumor, which weighed thirteen pounds.

The tumor of the left ovary presented grave operative difficulties. It also had to be tapped in several places, and even after this it was of enormous size. It was adherent to the walls of the abdomen, and to the intestines, and its pedicle was very thick and contained large vessels. I detached the adhesions with my finger and the scalpel, taking great care to cut toward the tumor. I then transfixed the pedicle as in the case of the right ovary. All this time the woman was on her left side, an assistant holding the intestines in the cavity with his hands. There was but little fluid in the cavity, which I swabbed out with a small antiseptic sponge, and, without irrigation, I turned the woman on her back again, closed the wound by suture, dusted it with iodoform, covered it with sublimate gauze, padded it with absorbent cotton, and bandaged it moderately tight. Only liquid food was allowed for about a week, viz., milk, beef-tea, and brandy. Neither the bowels nor the bladder called for interference, as they moved nicely of their own accord. There was no hemorrhage or rise of temperature, and only slight increase of the frequency of the pulse. There seemed to be complete union on the tenth day; but, as the sutures caused no trouble, I permitted them to remain until the fourteenth day, when I removed them and applied an abdominal supporter, and allowed the patient to leave her bed. She has been able to get up ever since, and at the present writing has fully recovered. The tumors and fluid weighed seventy-three pounds. Immediately after removal, the tumor of the right ovary weighed thirteen pounds, and that of the left nine pounds.

The history of this case case will afford valuable information as to the detection of ovarian tumors. About six months ago this woman observed a small lump about the size of a hen's egg, on the left side. A few days after

its appearance there was a circumscribed swelling, so that the lump could not be discerned, and several weeks afterward the swelling extended over the entire side. Thus far she experienced only slight soreness. About three weeks afterward she noticed a small lump on the right side; it also was movable, and swelling similar to that upon the left side ensued, during which time she for several days suffered excruciating pain. This swelling continued until it became as large as that upon the left side, so that the abdomen attained an enormous size.

Mrs. H. is thirty-eight years of age, the mother of one child, a girl five years of age. She is a slender-built woman; in health her weight never exceeded one hundred and thirty-five pounds.

MEDICAL PROGRESS.

Successful Trephining for Basal Hemorrhage.—SMART (*British Medical Journal*, No. 1614, p. 1204) has reported the case of a woman, forty-three years old, in which, following a blow upon the right parietal bone, the face became drawn to the right. There was no ptosis, no ocular deviation; the pupils were of moderate size, nearly equal, and they reacted fairly well to light; but there was left lateral hemianopsia. Motility and sensibility were impaired upon the left side of the body. Coma, with Cheyne-Stokes respiration, developing, two trephine openings were made, one at the seat of injury, the other a little anteriorly and inferiorly. There was free hemorrhage from the membranes, but no cause for the symptoms was found within reach of the director or finger. By exclusion, the original diagnosis of a right basal lesion appeared to be confirmed. At once, when the dura was incised, the breathing improved, the relief of pressure and tension being indicated by the occurrence of cerebral hernia. Subsequent improvement was progressive, the hemiplegic symptoms in some degree, however, persisting. A year after the accident there had been no relapse.

Aneurism of the Renal Artery.—OESTREICH (*Berliner klin. Wochenschr.*, No. 42, 1891, p. 1042) has recorded two cases of aneurism of the renal artery. One occurred in a woman, fifty years old, who, three months before death, had had an apoplectic seizure. Twelve days before death intermittent hemorrhage from the bladder set in. There were severe pains in the abdomen and a tumor could be felt in the situation of the left kidney. A diagnosis of malignant neoplasm of the left kidney was made. At the autopsy, in addition to several areas of softening in the brain, an aneurism of a branch of the left renal artery was found. The surrounding retroperitoneal tissues were infiltrated with blood, and the pelvis of the kidney was filled with coagula.

In the second case, which occurred in a young man who died of multiple embolism in association with malignant endocarditis, the aneurism involved the right renal artery and had occasioned no symptoms.

Successful Trephining for Abscess of the Temporal Lobe.—At a meeting of the Berlin Medical Society, BAGINSKY and GLUCK presented a five-year-old girl, in which, following the introduction of a pea into the left ear, suppurative otitis media, with perforation of the tympanic membrane, developed. In the course of a few weeks the pulse became slow and irregular, while headache, retraction of the abdomen, twitching of the extremities, and somnolence appeared. Subsequently the left pupil became smaller than the right, though both reacted to stimuli. There was no derangement of vision and no paresis of the upper extremities. The symptoms became threatening; the head was trephined; an abscess was found in the left temporal lobe. A little more than three ounces of pus was evacuated. The cavity was packed with iodoform gauze. The subsequent course of the case was uneventful, recovery ensuing.

Chlorine in Typhoid Fever.—YEO (*Lancet*, Nos. 3528 and 3529, 1891) has recommended free chlorine as the best agent for the antiseptic treatment of typhoid fever. Forty minims of pure hydrochloric acid are added to thirty grains of potassium chlorate in a flask and chlorine permitted to generate. In two or three hours water is gradually added, and the tightly closed flask is thoroughly shaken. Then sufficient water is added to make ten ounces. The result is an almost perfect solution of chlorine. To twelve ounces of this solution are added from twenty-four to thirty-six grains of quinine hydrochlorate and an ounce of syrup of orange-peel. In accordance with the severity of the case, an ounce of the solution may be administered two, three, or four times a day.

Gastrostomy in Stricture of the Esophagus.—At a meeting of the Glasgow Medico-Chirurgical Society, KNOX (*Glasgow Medical Journal*, 1892, xxxvii, 1) presented a man forty-eight years of age, who for seven months had had progressively increasing difficulty in swallowing, and loss of flesh. On examination, a stricture of the lower portion of the esophagus, impassable to a bougie, was found. As it was feared that the obstruction would ultimately become complete, gastrostomy was performed, the stomach first being sutured to the abdominal parietes, and, after an interval of a week, incised. Not only was it an advantage to be able to successfully nourish the patient through the artificial opening, but it was found that as a result of functional rest swallowing became considerably easier.

Thyroidectomy in Exophthalmic Goiter.—CAIRD (*Edinburgh Medical Journal*, September, 1891) has reported the case of a man, twenty-five years old, with a large cystic goiter, palpitation, dyspnea, dysphagia, protrusion of the eyeballs, and increased frequency of pulse, in which, a year after excision of the large cyst and the right lobe of the thyroid gland, the patient felt perfectly well, the eye no longer protruded, the pulse was less frequent than formerly, and there was no discomfort or dyspnea.

Pseudo-tuberculosis.—At a meeting of the Société de Biologie, CHARRIN (*La Médecine Moderne*, No. 43, 1891, p. 745) reported a case of granular tuberculosis, in which, post mortem, lungs, spleen, and liver contained large numbers of gray granulations, in which tubercle-bacilli could not be found. Animals inoculated from the granulations died and presented similar lesions, in which were found bacilli that stained by ordinary methods.

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SATURDAY, JANUARY 30, 1892.

THE EMPLOYMENT OF EPILEPTICS.

THERE is in this country no right provision made for many classes of people abundantly willing to labor for their own support, but who, by reason of partial and occasional disablement, are unfitted to compete in the open labor mart. These are the victims of many different maladies, but especially those suffering from one of the most unfortunate of human diseases, and one that is of the most ancient origin, namely, epilepsy, or the "falling sickness." The epileptic is not specially set apart from his fellows in childhood or early youth, or if in comfortable circumstances, but the moment he applies for work, and his malady becomes known, a sharp line is at once drawn. Be he ever so intelligent or industrious, this accident of disease constantly stands like a black mark against his name. His presence is only tolerated; he is got rid of at the earliest possible moment, and the difficulty of getting other work increases in geometric ratio, until presently he is relegated to the lumber-heap of incompetents, or becomes a hopeless pauper.

In a paper read before the Philadelphia Neurological Society last year on this subject, DR. J. MADISON TAYLOR, long deeply interested in this subject, says:

"If an employer be merciful and desires to give an epileptic a job, especially if this be among machinery, and if in a fit this poor creature falls and hurts himself, the law gives him the right to sue for damages, and, unjust as this may appear, it is often done. Even in the ranks of domestic labor a female servant cannot be tolerated long who falls ever so rarely in a loathsome-looking fit.

"Thus one way or another the door to honest labor is shut. Add to these constant disappointments the highly emotional nature so often a part of the disease before and after the fit, the inevitable mental and moral weakening that the disease breeds, and the sufferer may well be looked upon, as by the ancients, as a victim of the especial and fiercely directed anger of the gods.

"Could there be had a wisely devised series of havens for such, where the worst cases might be housed and others received daily, and all employed in proportion to their powers, it would constitute a worthy charity. Charity should be clearly distinguished from alms-giving. The great petition that goes up from humanity is for opportunity. Those that have good brains must choose and plan for those that are lacking. Such a system would offer immeasurable opportunities for the study, relief, and cure of the dread 'falling sickness.'"

DR. FREDERICK PETERSON has pointed out the consequences of this exclusion of the epileptic from the ordinary occupations of humanity:

"He is driven to find shelter in an asylum, not, as a rule, because he is deprived of reason, but because there is no other place for him to go. There are thousands of epileptics in insane asylums to day who do not belong there; for many will be found among them who are not insane, and it is an injustice to them as well as a detriment to the insane to associate the two classes. When we take into consideration the fact that a large majority of these unfortunates are gifted with as much intelligence as ordinary human beings, that they are as capable of education, as well adapted for everyday pursuits, quite as able to be self-supporting as most people, their unutterable woes become more apparent. But the conditions under which they may secure their proper mental development and their need of occupation must be such as combine medical supervision with wise industrial teaching and training. It was considerations of this kind that led Pastor von Bodelschwingh, twenty-four years ago, to establish a colony for epileptics at Bielefeld, near Hanover, in Germany. For nobility of conception and for excellence of result it is unique in our civilization. It seemed to this benevolent founder that it was feasible to create a refuge where, if curable, such sufferers might be cured; where at least their condition might be ameliorated, their intellectual decay prevented; where they might find a comfortable home if recovery were impossible; where they might develop their clouded mental faculties to the utmost, might acquire trades or engage in any occupation they saw fit to choose, and finally to grow into a community of educated, useful, industrious, prosperous, and contented citizens. There has been a fair realization of this project, and there has been a gradual evolution and expansion of the colony. Now it has over one thousand epileptic inhabitants.

When I visited it in 1887 it consisted of fifty-five houses and cottages, scattered in pretty gardens over some 320 acres of beautiful woodland and meadows. It was like a country village."

At this place are schools, stores, and shops of many kinds, a foundry, saddlery, dairy, brickyard, printing-office, and bookbindery—in fact, all of the factors that go to make up a well-rounded small community. These sufferers do all the work and do it well; they build houses, make bricks for the purpose, are excellent carpenters and good iron-workers, good painters and glaziers. For the men alone there are thirty different callings. The women are busied in the manifold cares of the households, manufacturers of wearing apparel and bed-linen, and the rearers of flowers and garden products. It would be useful to further describe this admirable little community, its work and its play. A full description is given by DR. PETERSON in the *Journal of Nervous and Mental Diseases*, December, 1889. Since this colony was started, nine other epileptic colonies have been established in Germany, one in Holland, and one in Switzerland. It is admitted that in the United States there are at least two epileptics to every thousand of population; hence, in the United States there must be over one hundred thousand persons suffering from this malady. The only difficulty in speaking of this matter is not to say too much, or to speak in a manner not to seem exaggeration. That systematic methods should be pursued in caring for epileptics needs no further demonstration. That which has been done in this country is as follows: A bill was introduced in the New York Senate by DR. PETERSON through SENATOR W. L. BROWN, and is now in the Committee on Public Health. We do not know what action has been taken in this matter recently, but even if the commission be appointed for selection of site and preparation of plans for a suitable institution, the realization of the ultimate result must inevitably be long deferred. There is one institution recently established at Gallipolis, Ohio, but we are not acquainted with its details and present work. In Boston DR. WILLIAM M. BULLARD read a paper last year before a section of the District Medical Society upon this subject, and a special committee of the Massachusetts Medical Society was appointed to consider it. There, so far as known, the matter now stands. This committee proposes to introduce a bill into the next Legislature, but in regard to the details of this bill nothing has yet been decided beyond the fact that at present the cottage-hospital system seems the most commendable.

But some action should be taken more broadly than would be possible in one city or State. If this idea, clearly defined, could be brought before the attention of any legislative body in America, it would certainly gain the most earnest support of all. Unfortunately, it would take an enormity of work and individual effort to secure this, and were it once secured the whole project might run dangers of being wrecked on partisan considerations.

If only the earnest workers in practical medicine throughout the United States—those conscientiously striving to limit the woes of their fellow-men—would give this reform their attention and active support, practical results would infallibly follow. It seems a subject eminently proper and worthy of being considered by medical associations, local and congressional.

AT WHAT AGE MAY A WOMAN MARRY?

THE question as to the suitable age for a woman to marry is one that concerns alike the philosopher, the political economist, the moralist, and the physician. It involves so many interests, and needs to be studied under such different aspects, that it is not strange the answers are sometimes widely different.

PLATO, in his *Republic*, asserted that twenty years was the proper age for a woman's marriage, while he deferred that of man until the age of twenty-five. MALTHUS regarded late marriage as the most important check to an increase in the population greater than the increase in means of subsistence. Wise political economists in general would postpone marriage until there is a reasonable assurance of ability to support a family. But the Catholic priest, looking at the question from a moral and religious point of view, holds that postponement of marriages among a large body of men is the fruitful source of evil. MR. LECKY, in his *History of European Morals*, makes the following statement: "The nearly universal custom of early marriages among the Irish peasantry has alone rendered possible that high standard of female chastity, that intense and jealous sensitiveness respecting female honor, for which, among many failings and some vices, the Irish poor have been preëminent in Europe; but these very marriages are the most conspicuous proofs of the national improvidence, and one of the most fatal obstacles to industrial prosperity."

The influence of idleness in hastening marriage is unfortunately quite positive. It would seem that manual laborers when out of work would postpone marriage, but observation proves that in many cases this is an error. For example, it has been observed at Manayunk, Philadelphia, that during strikes in manufacturing establishments marriages among the unemployed operatives are more frequent. The evil consequences of such untimely and improvident marriages are that pregnant women frequently do not have proper food, care, and rest, and that many a babe comes into the world without having been provided with suitable clothing to cover its nakedness and to protect it from one of the first perils of infant life—cold. If a law were made forbidding a woman to marry until the proposed husband could prove that he was able to support her and their children, the number of marriages would materially lessen; but, as in the old mythology, Cupid is blind, and law is impotent to govern those pierced by his arrows; certainly, however, wisdom will be justified of her children who do not rush into matrimony when the alliance inevitably leads to pinching poverty and squalid misery.

It is possibly true that early marriages may be advisable as a prophylactic against licentiousness; but it is protection of the male primarily rather than of the female that is thus sought. If young men had suitable and sufficient physiological, moral, and religious training, the necessity for such prophylaxis would be lessened. If, furthermore, the pitiless and inexorable judgments that society commonly visits upon the poor girl who lapses from virtue—branding her with a pariah-curse, and her offspring with a bastard's name and shame—were not thus restricted, if it were correspondingly severe to the author of her ruin, there would be less difficulty in deciding the matrimonial problem: a scheme of morals that punishes one transgressor exclusively fails in justice, and cannot abide—equal guilt demands equal punishment, without regard to sex. In certain circles the seducer is readily forgiven, and the man who has habitually associated with prostitutes can enter their sacred bounds, and in virtuous households become eligible and accepted as a husband, while the same households would not so much as let one of his former female associates be admitted into their kitchens, when she was endeavoring to end a life of shame and earn an honest living by daily toil. A woman had better never marry than open a private hospital and reformatory for a diseased and dissolute man. Too many young men are sowing wild oats, not thinking of the inevitable harvest—one that not only they, but also their wives and children must reap—of suffering, sorrow, disease, and death, instead of joy, happiness, health, and life. "Stop the licentiousness of men," said an experienced surgeon, "and more than one-half of the grave abdominal operations performed upon married women, so frequent in recent years, would not be needed."

But while the physician is political economist, moralist, and philosopher, or at least ought in some degree to be all these, looking at the question solely from a professional standpoint, the recently published investigations of KÖRÖSI at Budapest show that mothers permit their daughters to marry earlier than is best. According to his statistics the mortality of children is much greater when born from early marriages, while such of these children as do survive are not strong and healthy. In order that this mortality be reduced to the normal, the mother should be twenty-five years old when commencing to bear children. The young man of twenty is also too young to marry, if the interests of the children be considered. Furthermore, fecundity, *per se*, is not a cause of child-mortality if the parents have married at a suitable age, because, while true that this mortality is greater in large than in small families, the chief cause is found in the poverty of the former. Here again it seems that the question of marriage belongs in part to political economy. But in general it may be stated that a woman is wise who delays her marriage until she is twenty-four or twenty-five years of age; at least, this is the plain lesson to be learned from KÖRÖSI's investigations.

THE TREATMENT OF VALVULAR LESIONS OF THE HEART.

A SHORT time ago we incidentally took occasion to state that the mere existence of a valvular lesion of the heart is of itself not an indication for treatment. It is rather the rational signs of deranged function that furnish the indication. The condition of health depends upon the perfect performance by every organ of its respective function, as manifested by the maintenance of the systemic equilibrium, a disturbance of which constitutes disease. To be successful the treatment of disease must be directed to a restoration of the equilibrium, and the first

step consists in the removal, when possible, of disturbing elements. If these be irremediable, the indication is by natural or artificial means to make good or to neutralize the existing deficiency. That which in disease is analogous to the condition of normal equilibrium is known as compensation—and the attainment and the maintenance of this must be the ultimate aim of any therapeusis. There are two modes by which this object may be accomplished: 1, by whipping up the failing organ, or 2, by reducing the demands upon it.

In a most interesting and philosophic paper on the treatment of valvular disease of the heart, LIEBERMEISTER (*Deutsche medicinische Wochenschrift*, No. 46, 1891) makes medicinal treatment subordinate to mechanical treatment. The former is to be employed when definite indications exist; the name by which the lesion is known does not furnish the indication; each case must be judged for itself. In not a few cases there is a spontaneous tendency to the establishment of compensation. The reserve or latent force of the heart, that which in health is not ordinarily called into activity, is in disease drawn upon—and this is a point that practitioner and patient should realize. A heart embarrassed by a valvular defect may be competent to meet ordinary demands, but it will fail in the face of extraordinary demands. The functional capability of the individual heart must in each case be determined and the burden to be placed upon it regulated accordingly. Compensation for valvular defects means hypertrophy, but this dare not be excessive, for overgrowth begets premature degeneration.

Graduated cardiac gymnastics is an important factor and a useful adjuvant in the development of a compensatory hypertrophy. When shortness of breath and palpitation of the heart are absent, it may be considered that compensation has been established. Once established, it is necessary to its maintenance that the general nutrition, and with it that of the heart, be maintained.

The mechanical means of treatment of disease of the heart may well and often necessarily must be supplemented by the judicious employment of drugs. The best agent, that most general of application and the most reliable, is digitalis; but it should not be forgotten that a condition of tolerance, of insusceptibility to digitalis is soon established. To obtain the best results, the drug should not be continuously administered for a period longer than three or four weeks, and its administration should not be resumed until an interval of four weeks has elapsed after its withdrawal. The longer the interval that can safely be allowed to elapse, the better the result, both immediate and remote. If the valvular defect is great, or if the muscular fiber of the heart be degenerate, digitalis may fail to effect compensation. In some cases in which digitalis fails, one of its congeners, such as strophanthus, convallaria or caffeine, may succeed. Strychnine or atropine may prove of service. Calomel in small doses acts admirably as a diuretic. Laxatives find a useful place in treatment. Diaphoresis may be serviceable, though care must be observed that the temperature of the patient be not raised above 102.5°. Paracentesis may be necessary to remove accumulations of fluid; multiple puncture to diminish the degree of anasarca. A dry diet may accomplish like results, but it cannot be rigidly enforced. Tepid baths or brief applications of cold to the precordia may be sedative to an overacting heart. Alcohol, ammonia, or camphor may be required as stimulants. Under certain conditions of embarrassed circulation, when other measures have failed, brilliant, though perhaps only temporary, results may be obtained by free venesection. Venesection is indicated when manifestations of otherwise irremediable blood-stasis exist, as indicated by symptoms of pulmonary and of cerebral edema. We believe that when degeneration of the myocardium coëxists with valvular lesions, good may be accomplished by the employment of nitro-glycerin. The injunction to treat the patient and not the disease applies with especial emphasis to cases of valvular lesion of the heart.

SELECTIONS.

THE INFLUENCE OF INFLUENZA ON THE ENGLISH DEATH-RATE OF 1890.

THE report of the Registrar-General for 1890, relating to the births, marriages, and deaths in England and Wales during that year, has just been issued. The birth-rate, which had shown a continuous decline since 1876, was the lowest recorded during any of the last fifty years, although the marriage-rate during the last four years has shown a steady increase, and was higher in 1890 than in any year since 1883. With regard to the deaths during the period under review, it appears that the standard of public health reached in recent years was not maintained during 1890. The death-rate, which had been 19.1, 18.1, and 18.2 per 1000 persons living in the preceding three years, 1887–88–89, rose to 19.5 during 1890. It should be noted, however, that

compared with other earlier years, this death-rate was still a low one; for in none of the ten years, 1881–90, was the death-rate as high as 20.0 per 1000, whereas in no year previously to 1881 was it ever so low. The increase in the rate of mortality in 1890 is attributable to the epidemic of influenza, to which, although it was generally prevalent only during the first quarter of the year, 4523 deaths were directly ascribed. This, however, probably represents but a small proportion of the mortality really attributable to influenza; for the immense increase in the mortality from respiratory diseases at the same time, notwithstanding the mildness of the season, was clearly due to the same cause. The Registrar-General estimates the number of deaths directly or indirectly due to epidemic influenza in 1890 at upward of 27,000, which is equivalent to a death-rate of almost one per 1000. It is satisfactory to note that the mortality from nearly all other zymotic diseases was below the average. Only 16 deaths resulted from small-pox in 1890, the smallest number in any year on record. The deaths referred to constitutional diseases, especially to phthisis, showed a marked increase, probably attributable to the fact that a number of persons of phthisical constitution were prematurely carried off by the influenza epidemic during the earlier part of the year.—*Brit. Med. Journ.*

THE INFLUENZA-BACILLUS.[1]

I. Preliminary Communication on the Exciting Causes of Influenza. By DR. R. PFEIFFER, Chief of the Scientific Section.

The following results are based on the accurate examination of thirty-one cases of influenza, in six of which a necropsy was made. A complete report will be published as soon as possible:

1. In all the cases of influenza a bacillus of a definite species was found in the characteristic purulent bronchial secretion. In uncomplicated cases of influenza these tiny bacilli were found in absolutely pure cultures, and mostly in immense quantities. They were very frequently situated in the protoplasm of the pus-corpuscles. If the influenza had attacked persons whose bronchial tubes were already otherwise diseased—as, for example, tuberculous patients with cavities—other microörganisms besides the influenza-bacilli were found in the expectoration in variable quantity. The bacilli may penetrate from the bronchial tubes into the peribronchial tissue, and even reach the surface of the pleura, where, in two cases examined *post mortem*, they were found in pure cultures in the purulent exudation.

2. These bacilli were found exclusively in cases of influenza. Very numerous control examinations proved their absence in ordinary bronchial catarrh, pneumonia, and pulmonary tuberculosis.

3. The presence of bacilli kept equal pace with the course of the disease; with the cessation of the purulent bronchial secretion the bacilli began to disappear.

4. I had already seen and photographed similar bacilli in the same enormous quantities two years ago, during the first epidemic of influenza, in preparations of the sputum of patients suffering from the disease.

5. The influenza-bacilli appear as very tiny rodlets, of about the thickness of the bacilli of mouse-septicemia, but only half the length of these. One often sees three or four bacilli strung together in the form of a chain. They stain with some difficulty with the basic anilin dyes. Better preparations are obtained with dilute Ziehl's solution and with hot Löffler's methylene-blue. In this way it can be seen almost as a rule, that the two ends of the bacilli take the stain more intensely, so that forms are produced that can only with great difficulty be distinguished from diplococci or streptococci. In fact, I am inclined to believe that some of the earlier observers also saw the bacilli described by me, but that, misled by their peculiar behavior with regard to staining agents, they described them as diplococci or streptococci. The bacilli cannot be stained by Gram's method. In hanging drops they are immobile.

6. These bacilli can be obtained in pure cultures. On 1½ per cent. sugar-agar the colonies appear as extremely small droplets, clear as water, often only recognizable with a lens. Their continued culture on this nutrient medium is attended with difficulties, and up to the present I have not succeeded in carrying it beyond the second generation.

7. Numerous inoculation-experiments were made on apes, rabbits, guinea-pigs, rats, pigeons, and mice. Only in apes and rabbits could positive results be obtained. The other species of animals showed themselves refractory to influenza.

8. In view of these results, I consider myself justified in pronouncing the bacilli just described to be the exciting cause of influenza.

9. It is very probable that infection is produced by sputum charged with the germs of the disease; and the disinfection of the sputa of patients suffering from influenza is therefore urgently required as a prophylactic measure.

Addendum.—Dr. Kitasato has succeeded in cultivating the influenza-bacilli to the fifth generation on glycerin-agar.

II. On the Influenza-bacillus and the Mode of Cultivating it. By DR. S. KITASATO.

It is, perhaps, remarkable that in the case of a disease that in the last few years has attacked hundreds of thousands of persons, the specific exciting causes have, in spite of extremely numerous investigations, only lately been discovered. The cause, in my opinion, lies in the extreme difficulty of cultivating the tiny bacillus, and, without pure cultures a bacteriologist cannot, of course, come before the public with a new specific microörganism.

The difficulty of obtaining cultures of specific bacteria present in the sputum depends chiefly on the great contamination with microörganisms from the mouth, etc. The latter, in consequence of their more luxuriant and abundant growth, can, on our artificial nutrient media, completely overgrow and hide the particular parasites sought for. This occurs all the more easily the longer the time required for the specific parasitic microörganism in question to form colonies, as in fact happened in the case of the tubercle-bacillus.

[1] From the advance proof-sheets of the *Deutsche medicinische Wochenschrift*, in the *British Medical Journal* of January 16, 1892.

With the view of avoiding the obstacles in the way of a successful cultivation, Privy Councillor Koch has devised a method that has not yet been published, which enabled him many years ago, and myself again quite recently, to obtain pure cultures of tubercle-bacilli directly from the sputum, and which has also now been followed by me. The method to which I have just referred will soon be published in full detail.

With regard to the characteristics of the pure cultures of influenza-bacilli, I may emphasize the following points: On a sloping surface of set glycerin-agar the individual colonies present themselves as extremely small points, like droplets of water, recognizable during the first twenty-four hours only with the aid of a lens, so that macroscopically a test-tube containing them can scarcely be distinguished from a sterile one. The individual colonies are, as has been said, so unusually small that they may easily be overlooked, and it may thus have happened that previous investigators have overlooked them.

If a culture obtained from such a colony is placed on a new nutrient agar medium, numerous small colonies arise on the moist agar surface. A particularly remarkable point is that the colonies always remain separate from each other, and do not, as colonies of all other species of bacteria known to me do, join together and form a continuous row. This feature is so characteristic that the influenza-bacilli can thereby with certainty be distinguished from other bacteria.

The possibility of continued cultivation is now demonstrated. I have been able to reach the tenth generation in pure cultures. On gelatin the bacilli do not grow, as they do not generally multiply at a temperature lower than 28° C., which is the temperature at which gelatin solidifies. In bouillon they grow scantily. In the first twenty-four hours, single white particles are seen swimming in the bouillon, the intervening fluid being perfectly clear. Later, they sink to the bottom, and there form a white, woolly mass, whilst the supernatant bouillon remains entirely clear—a proof that we have to deal with an immobile bacillus. In conclusion, I may remark that I have accurately studied with the microscope and by culture for a long time the sputa of tuberculosis in respect to all the microörganisms besides the tubercle-bacillus occurring therein, and also the sputa of pneumonia, bronchitis, etc.; but the present bacillus, so extraordinarily characteristic in its cultures, and so easily to be recognized, has not come within my experience except in influenza patients.

III. On a Microörganism in the Blood of Influenza Patients. By DR. P. CANON, Assistant Physician in the Hospital Moabit, Berlin.

During the last few weeks I have, under the direction of Dr. P. Guttmann, examined the blood of twenty influenza patients in stained preparations, and in almost all cases I have found in the blood one and the same microorganism. The examination of the blood was made in the following way: A drop of blood obtained by pricking the finger was received on a perfectly clean cover-glass; this cover-glass was placed upon another, and the two then drawn apart. The preparations, after they had been thoroughly dried, were placed in absolute alcohol, in which they were left for at least five minutes. They were then taken out and placed in the following staining solution (Czenzynke's solution): ℞.—Concentrated watery solution of methylene-blue, 49 grams; ½ per cent. eosin solution (dissolved in 70 per cent. alcohol), 20 grams; distilled water, 40 grams. The cover-glasses immersed in this staining solution were placed in an incubator at a temperature of 37° C., and left there for from three to six hours, when they were washed with water, dried, and imbedded in Canada balsam. In the preparations of blood made in this manner, where the red blood-corpuscles were red and the white ones blue, I found the microörganism referred to. It is found stained blue, sometimes in large quantities, but mostly sparingly, and only to be identified after a long search (about 4 to 20 in the preparation). Sometimes it appears as a small diplococcus; sometimes, especially when it is more deeply stained, as a short bacillus.

In six cases I have found it also in numerous larger and smaller heaps of from five to fifty individual microbes with a very characteristic appearance. In these six cases, the blood was drawn during a fall of temperature or shortly afterward; in three of these, no further rise of temperature occurred. From three to six days later I failed to find the microörganism in the blood in these three last cases. Sometimes by means of preparations of the blood alone, I have been able to make the diagnosis of influenza, when clinically it was not certain. I have also found the bacteria in the blood, and, indeed, in considerable quantities in cases in which there was no appreciable local lesion, and especially no cough or expectoration. While making the preparations I have generally at the same time made streak-inoculations of the blood on agar-glycerin-agar, sugar-agar, and bouillon. In six cases the bouillon was injected into mice, partly at once, partly on the following day after it had been in the incubator. These inoculations and experiments on animals always yielded a negative result. As on the basis of my researches I am of opinion that this microörganism occurs in the blood of all persons suffering from influenza (at least, in that of those who have fever), and as it is not found in the blood of other persons, and as it is a microörganism hitherto unknown, I believe that it stands in direct relation to influenza.

Privy Councillor Koch had the goodness to examine some of my preparations, and pointed out that the microörganism visible in them was identical with the bacterium found by Staff-surgeon Dr. Pfeiffer, which has been described in the preceding paper, which is published at the same time as mine. I began these researches about the middle of December; I have, however, still a large number of preparations to stain and to examine. I propose to publish the results of the further research in a later communication.

CORRESPONDENCE.

ON THE INFLUENZA EPIDEMIC OF 1789.

To the Editor of THE MEDICAL NEWS,

SIR: It may be of interest to some to recall a few facts from an article in the *American Museum*, better known

as the *Universal Magazine*, on the epidemic of influenza that raged in this country during the Fall of the year 1789.

The epidemic began in the latter part of September, lasted six weeks, and spread very rapidly, disappearing as fast as it came, leaving quite a number in a very weak condition. The weather during the summer had been very dry; no rain falling, all ponds had been dried up, and were emitting foul odors; the thermometer was continually above 90°. The mortality is not given, but it is mentioned that when lung-trouble or consumption existed a speedy death was probable. Hard drinkers and old people were the first to die. To people at the seashore it was almost always fatal,[1] while people living an out-of-door life, such as sailors, longshoremen, etc., would have a much more severe attack than would men working indoors.

Two prominent symptoms were a feeling of fulness and stricture about the precordia, and an acrid discharge from the nose and bronchi that excoriated the mucous membrane, leaving about the nose and mouth large granulating sores for some time after.

Acute pain was felt in the head, fixed between the eyeballs, while Rush (page 355) reports "three cases which terminated in abscesses of the frontal sinus which discharged themselves through the nose. The pain before opening was so intense, the person almost losing his reason." Many complained of great itching in the eyelids; in some the lids were swollen, while others had true ophthalmia.

The ears were often involved, mastoid tenderness being very frequent, showing the implication of the mucous membrane of the Eustachian tube. Taste was often lost; toothache and swelled jaws were frequent.

On from the fourth to the fifth day the case would end by a free diaphoresis (Rush says "the sweats were very profuse, but afforded no relief to the patient"), leaving the person very weak, with a tedious cough, which, if the patient were susceptible, ran into pulmonary tuberculosis—in two cases into asthma.

The treatment seemed to have been rather varied, but that found best was the giving of mucilaginous drinks and fresh air in the room; small doses of antimonials and mild saline laxatives. Bleeding and opium, when used for the pain and fulness, were found to do more harm than good, and so were not much used.

During convalescence, bitter tonics and mucilaginous drinks soon placed the person in a condition to attend to his work.

In another part of the book the following was found, which was called *an effectual cure*: "Take four or five eggs and cover them with vinegar or lime-juice and allow to remain till the shells be dissolved, then add to them the following: Honey, brandy, sweet oil, āā Oss. S.: Take one tablespoonful every three or four hours."

In the spring of 1790 the influenza reappeared; everybody was again taken down with it, but those that suffered from affections of the head in the Fall were now afflicted with an attack that fell on the lungs and back, and *vice versa*.

Respectfully yours,

EDWIN S. POTTER, M.D.

1913 SPRUCE STREET, PHILADELPHIA.

[1] Rush: Medical Queries, 1805, vol. ii, page 358.

HEMORRHAGE IN TYPHOID FEVER.

To the Editor of THE MEDICAL NEWS,

SIR: The experience of Dr. Rodman (THE MEDICAL NEWS, January 9th) according so exactly with my own, I wish to give a treatment adopted by me some two years since for hemorrhage complicating typhoid fever. I have passed through two rather severe epidemics, and since, during this time, I have had perfect recovery in every case, the treatment certainly deserves consideration. It is very much like the zinc carbolate treatment of recent years, yet I had never heard of this zinc carbolate when I began using my formula. Under its use I have not had a single hemorrhage that demanded or received special notice or medication. I do not recall a case in which the tongue became brown or dry (a condition common under the old *régime*), when so treated from the beginning. I have taken charge of cases on about the twelfth day, the patient having a dry, brown tongue, pointed, and intensely red around the edges, and have had this condition to disappear like magic.

I have learned long since, that all things must be thoroughly tested before we can rely on them; that, although my cases have all recovered, it might not be due to a special line of medication, but to the fact that I have been fortunate in securing remarkably light cases, my fellow-practitioners losing theirs because they happened to get severer, or more complicated cases. Yet it seems that during more than two years of experience with this treatment, covering many cases, of all ages, I surely would have had all types to contend with.

Leaving a discussion of all symptoms out of the question, just as soon as I find I have typhoid fever to contend with I place adults on a sulpho-carbolate of quinine treatment, giving them—

℞.—Quininæ sulph. }
Potassii chlorat. } . . . āā gr. x.
Acid. carbol., pur. . . . ♏ x.

Capsules, no. x.

S.—One every four hours, with two, three, or four drops of oil of turpentine.

I know the quinine sulph. and acid carbol. are antidotal to each other, and that the resultant compound is insoluble, yet this very fact made it the more rational, because I did not care whether the remedy was dissolved in the stomach, or waited until it reached the lower bowel before assimilation. It does not matter whether the treatment is rational or not; it has proved a powerful factor for good in my hands, whether or not this is due to its beneficial effect or to its insolubility, and consequently the doing of nothing according to the expectant plan. Instead of the new and depressing antipyretics, I use tincture of veratrum viride, in doses of one, two, or three drops as necessary, to control fever. I feed persistently from the beginning with fluid foods, using both beef and bird soups, and sweet and butter-milk, alternating these and insisting on one of them at least every two hours. Of course, complications are met as they arise, but in the main the treatment is persistently adhered to from beginning to ending of the fever. I firmly

believe that it will shorten the duration of every case of fever by several days.

Very respectfully,

J. E. STINSON, M.D.

MONTAGUE, TEXAS.

IVORY PEGS.

To the Editor of THE MEDICAL NEWS,

SIR: In an article by Dr. O. H. Allis, on "Ununited Fractures" (THE MEDICAL NEWS, January 2, page 3), the author says that pegs are not absorbed; that suppuration takes place, and that fixation is not satisfactory.

There are certainly exceptions to this rule. I have only used ivory pegs once—in an ununited fracture of the tibia: one peg was almost wholly, and the other one-fourth absorbed at the end of five weeks. There was no suppuration, and fixation was satisfactory. If desired I will send what remains of the pegs.

Respectfully yours,

G. S. ARMSTRONG, M.D.

OLYMPIA, WASH.

NEWS ITEMS.

The Annals of Ophthalmology and Otology is a new quarterly of 74 pages of excellent reading matter, well printed, and edited by Dr. J. P. Parker, of Kansas City, Mo. The subjects united in the title seem to imply that the two specialties are often still conjoined by the single practitioner.

The Medical Fortnightly is the name of a new journal to be published at St. Louis on the first and fifteenth of each month. The first number bears the date of January 1, 1892; it presents a neat appearance, and contains several interesting articles. Dr. Bransford Lewis is the editor-in-chief; he will be assisted by a number of associates.

Seventh Annual Report of the Adirondack Cottage Sanitarium.—For the year ending November 1, 1891, one hundred and thirty-six tuberculous patients were treated at the Adirondack Cottage Sanitarium. There were but two deaths, and these in advanced cases. Of seventy-seven patients discharged, fourteen were apparently cured; in twenty-three the disease was arrested; twenty-two were improved and eighteen were unimproved. The results were better in proportion to the time that patients remained under treatment. In eighteen cases injections of tuberculin were conjoined with the usual treatment. Of the six of these cases discharged, two were apparently cured; in two the disease was arrested; one was improved, and one was unimproved.

Leprosy in Russia.—The first leper-house in the Baltic provinces of Russia was recently opened at Riga. It is intended, provisionally, to accommodate twenty men and seventy women. The medical and administrative staff live in a separate building, and the attendants live as remote from the patients as possible.

A Balneologic Congress will be held at Berlin from March 10th to 13th, under the presidency of Professor Oscar Liebreich.

BOOKS AND PAMPHLETS RECEIVED.

Transactions of the Association of American Physicians. Vol. VI. Sixth Session, held at Washington, D. C. Philadelphia: Printed for the Association, 1891.

The Physician as Business Man; or, How to Obtain the Best Financial Results in the Practice of Medicine. By J. J. Taylor, M.D. Philadelphia: The Medical World, 1520 Chestnut Street, 1891.

Massage and the Original Swedish Movements. By Kurre W. Ostrom, Instructor in Massage and Swedish Movements in the Philadelphia Polyclinic, etc. Second Edition, Enlarged and Illustrated. Philadelphia: P. Blakiston, Son & Co., 1891.

Diagnosis and Treatment of Hemorrhoids and Other Non-malignant Rectal Diseases. By W. P. Agnew, M.D. Second Edition. San Francisco, Cal.: R. R. Patterson, 1891.

Some Unusual Fractures of the Leg. By Fred. Jenner Hodges, B.Sc., M.D. Reprint, 1891.

Trop de Mutilations Inutiles pas Assez de Gynécologie Conservatrice. Par le Docteur A. Doléris, Accoucheur des Hôpitaux. Extrait des Nouvelles d'Obstétrique et de Gynécologie, août-septembre, 1891. Clermont (Oise): Imprimérie Daix Frères, 3 Place Saint-Andre, 1891.

Torsion, with Description of an Automatic Forceps for Rapid Torsion. By F. M. Briggs, M.D. Reprint, 1891.

Food in Health and Disease. By I. Burney Yeo, M.D., F.R.C.P. Philadelphia: Lea Bros. & Co., 1891.

Analysis of the Sensory Changes of the Ocular Apparatus as Found in Imbecility, Epilepsy, and General Paralysis of the nsane. By Charles A. Oliver, M.D. Reprint, 1891.

Surgical Shock. By J. E. Tefft, M.D. Reprint, 1891.

The Climate of Southern Arizona. By John Traill Green, A.M., M.D. Reprint, 1891.

Age of the Domestic Animals. By Rush Shippen Huidekoper, M.D. Illustrated with 200 Engravings. Philadelphia and London: F. A. Davis, 1891.

Deafness and Discharge from the Ear. By Samuel Sexton, M.D., Assisted by Alexander Duane, M.D. New York: J. H. Vail & Co., 1891.

A B C of the Swedish System of Educational Gymnastics. By Hartvig Nissen. With 77 Illustrations. F. A. Davis, 1891.

Annual Report of the Postmaster-General of the United States for the Fiscal Year ending June 30, 1891. Washington: Government Printing Office, 1891.

Report of the Chief of the Bureau of Medicine and Surgery to the Secretary of the Navy, 1891. Washington: Government Printing Office.

Twentieth and Final Annual Report of the Philadelphia Dispensary for Skin Diseases. Philadelphia: Spangler & Davis, 1891.

The Modern Treatment of Disease; A Practical Résumé o Modern Methods Employed in the Treatment of Chronic Articular Osteitis of the Hip. By Charles F. Stillman, M.Sc., M.D. Detroit, Mich.: George S. Davis, 1891.

The Upper Air-passages and Their Diseases. By O. B. Douglas, M.D. Reprint, 1891.

The Hydriatic Treatment of Typhoid Fever. By Chr. Sihler, M.D., Ph.D. Cleveland, Ohio: Chr. Sihler, 1891.

Ferments Contained in the Juice of the Pineapple, etc. By R. H. Chittenden, Assisted by E. P. Joslin and F. S. Meara. Reprint, 1891.

Diphtheria. By Daniel Strock, M.D. Reprint, 1891.

Ichthyol; a Contribution to Therapeutics. By T. Cranstoun Charles, M.D. Reprint, 1891.

L'Ittilio nella terapia dei morbi utero-ovarici. Osservazioni del Dr. Albertoletti, assistente nell' Ospedale Maria Vittoria, 1891.

The Technique of Cerebral Surgery. By G. Wiley Broome, M.D. Reprint, 1891.

The Principles of Bacteriology. By A. C. Abbott, M.D. With Illustrations. Philadelphia: Lea Bros. & Co., 1892.

The Ameba Coli. By Alfred Stengel, M.D. Reprint, 1892.

Report of Cases of Cholecystotomy. By A. Vander Veer, M.D. Reprint, 1891.